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Municipal Progress in South Africa—The Garden City in the Land of Good Hope

By Rev. Thomas Pierce, M. A., S. T. B.

Chairman of the Public Welfare Committee, and Municipal Councillor,
Uitenhage, Cape Province

FOR about four centuries Americans have looked upon Africa as merely the Dark Continent, the aboriginal habitat of the negro slaves of the Southern States. The travels of Stanley and Livingstone, the exciting events of the Boer War, and the hunting trip of the late Theodore Roosevelt, may have left some impression on trans-Atlantic minds; but this impression is too often a highly-colored view of a land of great adventure, all-pervading romance, trackless

deserts, endless jungles, majestic beasts, and naked savage tribes. One might think that the enormous increase in the volume of trade between South Africa and the United States since the beginning of the late European war must have made this particular section of Africa better known in the great western republic. To a certain extent this is true. Financial, commercial and industrial interests in America no longer consider this country as merely the producer of one-



ONE OF THE ATTRACTIVE BUILDINGS OF THE GIRLS' HIGH SCHOOL, UITENHAGE,
SOUTH AFRICA

half of the world's gold supply and nearly all the world's diamonds; it is now to American business men a promising field for investment and trade expansion. Yet many of these very merchants and capitalists, in common with millions of their intelligent and educated fellow-countrymen, have not the least conception of what this corner of the habitable globe is really like.

The Modern South Africa

When the writer of this article, who was born a few hundred miles from Washington, landed in Capetown some years ago he began to experience some of the biggest surprises of his life. Even the very negroes at the docks looked familiar. Many of them spoke English very passably, as well as their own native language and one or another of the many varieties of South African Dutch. And the city itself proved large, beautiful and perfectly modern. One felt quite at home in such a place, and had to wonder how on earth his ignorance could have been so crass!

All preconceived notions of South Africa are very rapidly driven out of the minds of any son or daughter of Uncle Sam who may chance to come this way. There are no skyscrapers here, but such cities as Capetown, Johannesburg, Pretoria, Durban, Pietermaritzburg, Bloemfontein, East London and Port Elizabeth would adorn any country. They teem with life and are full of energy. Everywhere is evident a love of beauty and modernity. Trolley lines are found in all the big centers, and very often the trams, or street cars, are made in Philadelphia. Hundreds and even thousands of automobiles, motor trucks and motor-cycles fly over the paved streets and charming driveways, and it is safe to say that more than 75 per cent of these vehicles were shipped from some American port. The municipal and government buildings, the hotels, clubs, schools, colleges, theaters, churches, wholesale and retail houses are often very imposing and architecturally splendid. First-class libraries, hospitals and museums abound. Municipal swimming baths, parks and recreation grounds afford endless delight to old and young alike. Electric light and power is highly prized, even in the smaller towns, while here and there are fair imitations of Broadway or Michigan Avenue! Not a few cities and towns possess sanitary sewerage, and others are seek-

ing this modern convenience and necessity of community life. In the matter of municipal abattoirs and meat and food inspection, South Africa is far ahead of the United States as a whole! Who, then, can travel over our network of railways and visit our cities and towns and still imagine that the Union of South Africa is not a progressive country?

Progress, of course, does not always come by leaps and bounds in any land. But it has a good grip on this rich and rapidly developing young nation. There is more truth than poetic fiction in the designation of South Africa as the "Land of Good Hope." In some quarters may be discovered a policy of ultra-conservatism, or even of opposition to modern progress, but the majority of the people, especially in the towns and cities, are daily becoming more and more enamored of the policy that we call progressive and public-spirited.

A very good example, in proof of this assertion, may be found in Uitenhage, where the writer resides. This is a town of about 14,000 souls—not a very big place, but a place with a future. It is situated on the main railway line between Capetown and Port Elizabeth, and only 21 miles from the latter city, which is one of the chief seaports of the Union. There are large railway workshops here, two wool-washeries, a tannery, an extensive nursery, a clothing factory, a boot and shoe factory, several brick kilns, and some minor industries. Many large market-gardens ship their produce to all parts of the Union. Because of its gardens, nursery, parks, trees and wide-spread floriculture, Uitenhage is known as the "Garden City" of this Colony. It is also one of the principal educational centers in the Province, possessing, as it does, besides the half dozen public and parochial schools for primary and kindergarten education, a Training College for European teachers, and another for colored teachers; a High School for boys and one for girls; an industrial school for boys; and the Marist Brothers' College, which is the headquarters of this community in South Africa, and a very commodious establishment.

Plans for Future Public Works in Uitenhage

The Uitenhage municipality owns its electricity plant, water-works and abattoirs. It carries on the waste removal service. Last



MUNICIPAL SWIMMING BATH AT UITENHAGE, SOUTH AFRICA

year the writer brought forward a rather comprehensive scheme of town improvements, but the only feature that was eventually adopted was the purchase of two electric lorries for the sanitary removals. Uitenhage is the first place in Africa to use motor transport for such a purpose. Not deterred by the fate accorded to that first big scheme, the writer proposed a still more ambitious one in the month of October, 1920, seven months after his initial defeat. The people had been thinking in the meantime, and a far better reception was given to this new proposition, which included the augmenting of the water-supply by the construction of a conservation dam on the river, twelve miles from town; the metering of the entire domestic and industrial water-supply; the installation of sanitary sewerage for the town and native location; the paving or repaving of all the streets after sewers had been laid and water-mains cleaned; and the extension of the municipal tree-planting area. The estimated cost of these works and improvements was £300,000. An uncivic clique of obstructionists, who had been accustomed to having their way for a quarter of a century or more, naturally gave battle. The Council itself refused to have anything to do with such a scheme. It was said that Uitenhage could not afford to spend so much money; that the cost would be two or three times the estimated sum; that part of the scheme was good, but the

remainder of it was hopeless, or "too previous"; that the Councillor who originated it didn't know what he was talking about, and so on and so forth.

Nevertheless, at a public meeting of the rate-payers, a 40 to 1 majority was secured for a mandate to the Municipal Council, compelling them to have the scheme investigated by competent engineers and accountants, and then to resubmit it for the approval or rejection of the enrolled voters. Only 11 persons out of more than 400 present voted against this resolution, and 7 of the 11 were Councillors! The opposition then demanded a poll, which was held 19 days later, and resulted in the confirmation of the mandate by 652 votes to 459, a majority of nearly 200, with 1,111 ballots out of a possible 1,700 being recorded.

Thereupon the investigation of the scheme began. A committee of three Councillors, with the writer as chairman, was appointed, with power to act in the matter. Tentative quotations were sought from South African, British and American firms. Consulting engineers prepared plans and specifications and cost estimates for the dam, the sewerage system and the road-making program. It was found that the author of the scheme had not been out 3 per cent in his original estimate of the total cost. The enrolled voters will be asked to approve the scheme within the next few weeks, and it is morally certain that they will have done so before

this article is read in the United States. The attitude of the townspeople is altogether favorable. This may be judged from the fact that, owing to the nature of the opposition raised against the scheme, and the stubborn refusal of nearly half of the Councillors to carry out the mandate of the citizens, a Public Welfare, or Vigilance Committee, was formed in December last, and the writer was unanimously elected by the enrolled voters to serve as Chairman.

Now, when Uitenhage has completed these public works and improvements, it will be one of the prettiest and most desirable residential towns that one could wish to see. No place in Africa will possess superior advantages; there is no city or town in Africa that has universal sanitary sewerage, a 100 per cent metered water-supply, or modern pavements on every foot of its streets and lanes. It is proposed to relay any defective water-mains, to attend to underground cables, and to lay service connections, even for unimproved lots, from the water- and sewer-mains to the outer edge of all paved streets, so that future extensions will not necessitate the tearing up of the asphalt pavements. There will be a parking space between the roadway and sidewalk curbs, and trees will be planted where none now grow, although the town is at present extremely well provided with shade trees of oak, gum, pine, Grevillea, etc. The municipality has a tree plantation today, but other and much larger sections of the commonage will be devoted to the cultivation of trees with a commercial value as mine-props, timber, etc. It is also proposed to clear and subdivide several hundred acres of the best irrigable land on the commonage nearest the town, and rent or sell these blocks for gardening as soon as the water from the conservation dam is available. The sewerage farm of more than 300 acres will bring the municipality a net annual revenue of something between £2,000 and £4,000. The revenue in sight from this farm, from the tree-planting and from the sale of commonage lots, will more than pay for the entire scheme within the life of the loan!

Administrative Reforms Proposed

There is provision made also in this town improvement scheme for the reorganization of the municipal administration, and the creation of three new departments. At the

next Municipal Congress, to be held in 1922, the writer intends to move a resolution asking the Administrator and Provincial Council to legalize the raising and repayment of municipal loans by the sale and redemption of serial bonds, and to render possible the adoption of the town manager plan of local government. At the present time, municipal loans are repayable by annuities or sinking funds, but the writer has reason to believe that the serial bond method will be duly authorized, provided it is approved by the Congress of Municipal Councillors and Officials, as it certainly will be. As regards the town manager plan, some of the largest cities in the country have been investigating this method for the past two years or more. It appeals to the business instinct, and to the universal desire for greater efficiency and economy in the administration of municipal affairs.

According to our laws, proportional representation may be adopted for the election of Councillors, if the enrolled voters approve a petition to that effect. Within the next month the Uitenhage Public Welfare Committee is going to call a public meeting in advocacy of proportional representation, explain the advantages and operation of the scheme, and conduct a model election for the purpose of elucidating the method of voting and counting. Later on, another meeting held under the provisions of the Cape Municipal Ordinance of 1912 will be asked to forward the required petition to the Administrator. In a general way, the people already understand the superiority of proportional representation over the old ward system, and they are demanding relief from the many evils that the latter method of election has produced. There is no doubt that the Welfare Committee's proposal will be approved by 80 per cent or even 90 per cent of the people; only the corruptionist and obstructionist "die-hards" will oppose it. But their day is at an end. The two local papers, as well as the vast majority of rate-payers and enrolled voters, are now supporting a program of progress.

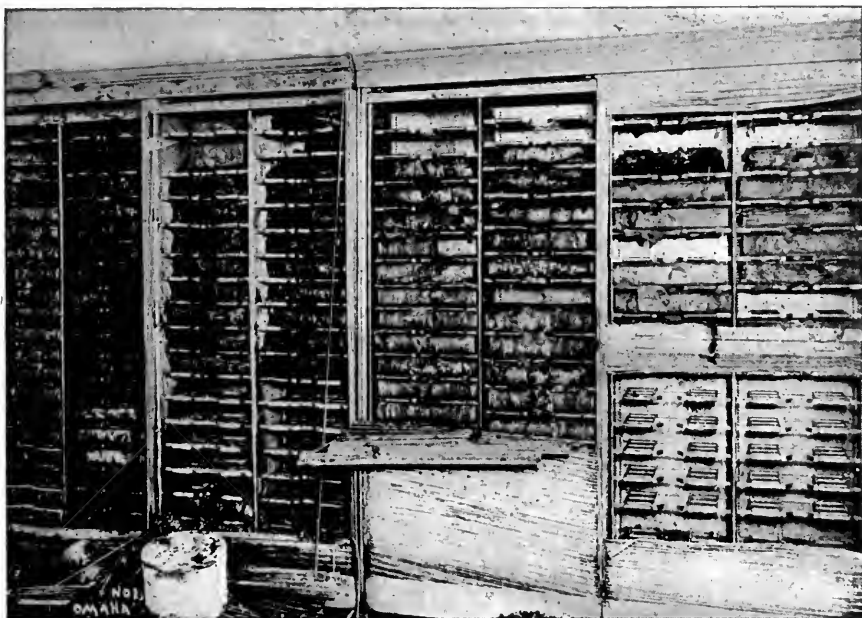
The new spirit that has manifested itself in Uitenhage has been aroused in many other towns and cities in South Africa. When times become more normal, there is certain to be a rapid development of civic pride and progressiveness, to keep pace with the growth, prosperity and higher ideals of the country.

The Protection of Public Records

By M. L. Carr

IT is probably no exaggeration to say that hundreds of tons of public records are not protected at all from fire, and that large quantities are given little, if any, protection from careless handling, loss and the ravages of time. The writer once had occasion to consult certain public records in one of our western states, and chanced upon the records of the marriages and births of that

It is useless to speculate upon the reasons for our national failing in this respect, except for the fact that the reasons may suggest methods by which it can be changed. Neither will looking at fire ruins or the pictures of fire ruins bring about any change unless they are studied with a view to devising means of fire prevention and fire protection, except for such value as they may



THE FATE OF RECORDS ON OPEN SHELVES IN THE OMAHA COURT HOUSE FIRE, SEPTEMBER 28, 1919. METAL CONTAINERS AFFORD NO PROTECTION

community so sadly neglected that loss through carelessness, or worse, of clerks and the curious was inevitable. This court house, by the way, has since burned, and all the records of years have gone up in smoke.

It would seem self-evident that, if an event or a transaction is of sufficient importance to make a record of it, the record is sufficiently valuable to preserve. In fact, the word "record" connotes preservation. If we are too careless, too indifferent, or too penurious to make the necessary provisions for preserving our records, it would be better to sell those of historical value as museum specimens.

have in drawing public attention for the moment to the subject. What is most needed is some form of propaganda, or campaign, to direct public attention to the subject, and definite plans made for providing protection if public sentiment is sufficiently aroused to demand it. Whether or not a public campaign would be worth while depends to a large extent upon the possibility and the feasibility of providing the necessary protection. Obviously there is no use in creating a demand for something that cannot be furnished.

Even though the science of providing protection for modern business records is

young, much progress has been made, and protection can be provided that at the same time meets the needs of present-day business. One reason for the unprotected state of public records is the fact that the volume of them has grown far beyond the capacity of the containers originally provided, on account of the increase in the number and extent of governmental activities, and because we now have facilities for making more and better records. The record containers our grandfathers provided are not adapted for housing the voluminous correspondence, card indexes and other modern records now necessities of our life.

Make a Survey of the Building

Any decision to provide more record protection in an existing building, either public or private, should be put into effect systematically, and not in a haphazard manner. The proper method of procedure, as would naturally suggest itself to anyone, is to make a comprehensive survey of the building in order to determine what records are in it, how they are housed, and, last but not least, the kind of building considered from the fire protection view-point.

A survey of the records includes notation of their kind, volume, relative values, and distribution throughout the building. It will probably reveal a large quantity of many kinds of records, varying from those of little to those of inestimable value, with even chances that the most valuable ones are in the most hazardous situations. It may even be found that there are large quantities of no value that could be disposed of, thereby yielding space.

A survey of the record containers in use will mean listing them with reference to the records they contain, and an appraisal of their value considered from the fire protection view-point. It will probably reveal everything from open shelves to vaults. Wooden and metal filing cabinets afford protection for only a few minutes against fire of any considerable severity. Furnace tests of wooden and metal cabinets have shown the two kinds to be about on a par in so far as the degree of fire protection they afford their contents is concerned. While steel will not burn, it transmits heat rapidly, and the safety of records in close proximity to red-hot metal is easily imagined. Wooden cabinets transmit heat more slowly, but will themselves burn.

The fire protection afforded by safes of the cabinet type is easily ascertained if they bear labels of the Underwriters' Laboratories. If they do not bear such labels, the degree of protection afforded can only be guessed at. If their walls are hollow, with no insulating material in the walls, they will afford protection to contents for not more than a few minutes, that is, practically no protection except from a fire in its incipient stage. There are unlabeled cabinets on the market with insulation in their walls, but as the degree of protection they will afford is an unknown quantity, it is safest to assume a very low value in appraising them.

When we come to the old-style safes of the conventional type, we are confronted with another problem in appraising their fire-resisting value. The volume of records stored in old-style safes is likely, however, to be small in comparison with the total volume of records in most large public buildings.

The most difficult appraisal will be that of the vaults. The Baltimore, San Francisco, and numerous smaller fires have shown that there is much misplaced confidence in vaults. It is not safe to judge a vault by appearance, especially one with thin walls. Plaster hides a multitude of defects and lends an appearance of solidity to a very frail structure. Unless someone who really knows what is good building construction can vouch for the character of the vault walls, the only safe thing to do is to remove the plaster and make an examination, a course that is certainly not proceeding along the lines of least resistance in making the survey. Fire will remove it, though, and find the hidden defects. Fire will do what prudence neglects. Common defects in vault construction are walls lacking in fire resistance, insecure supports, such as unprotected structural steel, holes and cracks in walls, un-insulated doors, lack of inner doors, poorly fitted and insecurely mounted doors. A vault recently examined was found to have a crack in a corner through which daylight could be seen. Fortunately, it happened not to have been severely exposed by the fire which destroyed the building.

A survey of the structural features of the building is necessary, of course, in order to afford a basis for judging the probable severity and duration of fire which may occur in it, and determining whether fire will spread rapidly without much prospect that

it can be brought under control, or whether it can be confined to one section of the building, thus giving the fire department a chance. A survey of the average public building is almost certain to reveal open stair shafts and other ideal channels for

parts of the building. Do the same for other containers so far as floor strengths and weights will permit, so as to provide containers possessing the requisite fire resistance for the situations. Experience and judgment are at present the only guides for



PROTECTION AFFORDED BY WOODEN FILING CABINETS IN NEW YORK BOARD OF EDUCATION FIRE, FEBRUARY 1, 1918

Some of the records were not destroyed, but it was apparent that a fire stream, and not the container, saved them

distributing fire throughout the structure. The amount of combustible material in the building itself will vary from practically nothing to all of the material in it.

Make Use of the Survey

Provided with the data of the survey, the next step is to study them with a view to utilizing to best advantage the record containers already in use, and to determine the kind and amount of new equipment needed. First relegate to containers of low or unknown fire-resisting qualities stationery and records of very little value. This probably means shifting such containers to different

doing this, and a competent fire protection engineer should be consulted.

For records not housed, it will probably be found that the modern approved metal filing cabinet is the only type of container that it is practicable to use. The old-style safe is out of the question, if any considerable volume of records is to be taken care of, because of small storage capacity for its size and weight and because it is not, as a rule, adapted to housing filing equipment.

New vaults in convenient locations will in all probability also be out of the question in the average public building in need of additional fire-resisting storage capacity.

Under such conditions floor space will already be at a premium. Even if this is not the case, structural and architectural reasons will usually prevent their being built in locations convenient for daily use and where proper support can be provided. It obviously would be a very expensive proposition, for example, to build a fire-resisting vault on any but the ground or basement floors, and to provide supports that will not give way when subject to fire in an existing building with wooden floor beams. If the building is sufficiently modern to be of really fire-resistive construction, vaults can, of course, be provided on any floor, but they are wasteful of space and clerks' time and are unnecessary. It increases office efficiency greatly to provide each group of clerks with a safe conveniently located. Safes are necessary, however, to protect records, as combustible contents of such buildings can burn. The greater the amount of combustible contents, the better the safes must be, and conversely.

There is a place where vaults can be built to advantage in old public buildings and utilized to house non-current records, and that is in basements. This means that fewer and smaller safes will be required in the working spaces.

When record protection is mentioned we are inclined to think only of safes and vaults and to forget that any measure which lessens the fire hazard of the building reduces the danger to records in it. In other words, if we looked upon the entire public building as a record container, a huge safe or vault, as it were, we might take the question of providing better fire protection more seriously.

The installation of an automatic sprinkler

system in a public building would be much cheaper than replacing the building. West Virginia doubtless would have its Capitol today had it been equipped with an adequate sprinkler system. If we could persuade our architects to enclose open stairways with wired glass, even, rapid spread of fire in its incipient stages would be hindered, thus giving fire departments a better chance. True, wired glass is not the ideal material to use, but it is preferable to nothing. It will be on duty twenty-four hours a day, whereas esthetic senses sufficiently refined to be injured by its use may not be jarred more than a few times in a year. It is by no means proved to the layman that vertical openings in buildings are not susceptible to architectural treatment which will render them safe without making them eyesores. Ira H. Woolson, of the National Board of Fire Underwriters, finds that 80 per cent of our fire losses and 90 per cent of the losses of life are due to unprotected vertical openings in buildings.

Our records are not all made with paper and ink; some are in brick and stone. Who will say that Independence Hall is not as much a record of our early history as the Declaration of Independence or the Constitution of the United States, so inadequately housed at Washington? The Capitol of West Virginia, with all the associations which years attach to a public building, was no less a record of the thoughts and aspirations of a people than the documents in it. Perhaps if we thought oftener of our public buildings in this light we would make more strenuous efforts to preserve them. Let us endeavor to remember that it is our duty to guard the records the past has intrusted to us, and to hand them on to future generations.

The Value of Health

The fundamental value of health in life and in a program of education is obvious. Big business has discovered that health means wealth, both for itself and its employees. One firm, for example, found that by the introduction of free dental clinics the output from its factories was greater than ever before. The average number of days of labor per man was increased, and the profits for the firm and the wages of the men

before. The men were happier and more efficient in every way. The school may profit from these suggestions. The realization of all the worthy aims of education depends primarily on the health of its people. To have healthy children means a happier and more successful school and a finer standard of citizenship.

DR. J. MACE ANDRESS,

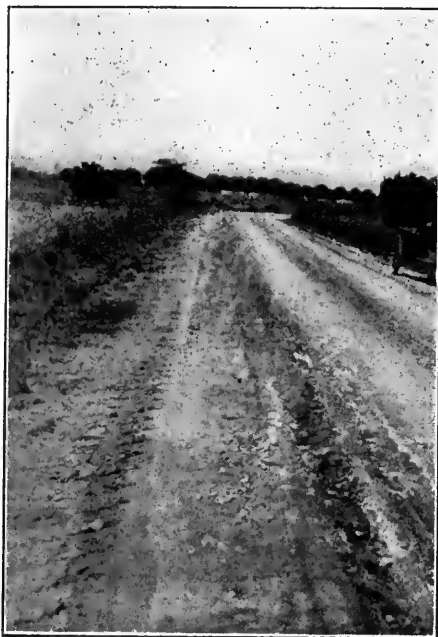
Methods of Dust Prevention for Maintenance and Preservation of Gravel Roads

By G. C. Dillman

Maintenance Engineer, Michigan State Highway Department

THE subject of dust prevention and maintenance of gravel roads is of vital importance. It is a matter that has too often been loosely handled if not left entirely out when plans and estimates for the year's maintenance program have been made. It would be much better if road officials and engineers would take the initiative in this matter rather than have the issue come about through public opinion. And the public is awake to the situation now. Evidence of this is the widespread interest of business and civic organizations as well as private individuals. Until a few years ago the public was concerned with this subject in cities and villages only, but equal interest now prevails in the country as well. I believe we can hear the public cry, "More dustless roads!" as though it comes from far away, yet if we do not make more of a coöperative and intelligent effort to render our principal gravel roads more nearly dustless when subjected to fast-moving traffic, this cry will be thundered in our ears.

There are many reasons why roads should



AN UNTREATED COUNTRY ROAD—DUSTY AND RUTTED



SAND AND GRAVEL ROAD, HENNEPIN COUNTY, MINN., TREATED WITH THREE HOT APPLICATIONS OF TEXACO LIQUID ASPHALT AT A RATE OF $\frac{1}{8}$ -GALLON PER SQUARE YARD EACH, TO BIND THE SURFACE AND ELIMINATE DUST

be kept as nearly dustless as is possible. The enormous quantity of dust annually swept from our lower-type roads proves a nuisance, and is unhealthful not only to people traveling the highways, but to persons, livestock and vegetation adjacent to them. Clouds of dust add an extra element of danger for people using the roads. Material blown or swept from the road itself is lost and must be replaced at a big annual expense. These objections and others that might be mentioned are a menace to the public in general.

Causes of Dust Formation

Dust is matter in a finely divided state. That its connection with the gravel road may be thoroughly understood, we should consider the causes for its being present. These causes, in the order of their importance, are wear, binder or filler in the gravel, and foreign material carried onto the road through several possible agencies.

All forces tending to disintegrate the gravel road produce wear. Chief among these is traffic. The extent to which the road may be destroyed by traffic depends directly upon the nature and the intensity of traffic and the ability of the gravel itself to withstand the abrasive and impact effects. This type of road surfacing is rather susceptible to the action of the elements. The physical effects wrought by frost action and rain falling and washing the filler out of the gravel are common knowledge. The wear occasioned by the action of such forces as named is partially within our control, and we may practically eliminate the dust nuisance by certain methods.

The nature of the binder or filler in the gravel is very often the source of much dust. Wearing surface gravel to be used on roads carrying heavy traffic should contain but a small per cent of clay or sand and no vegetable matter. Herein lies one of the direct causes for some roads being so terribly dusty. Filler of this nature has very little if any wearing qualities and is not a good binder. Then why do we continue the use of such material, actually wasting the money invested in that binder, and contributing on a wholesale scale to the dust nuisance? A legitimate excuse for this, I believe, cannot be given.

The fault of putting on gravel containing a large per cent of poor filler does not lie wholly with the construction forces. In

fact, a large part of it is placed as maintenance in the nature of patching and light resurfacing. Such work should be discontinued, and by so doing the problem of dust prevention becomes smaller and offers an aid to the preservation of gravel roads.

Methods of Preventing Dust and Preserving Gravel Roads

There are two general ways in which the dust problem on gravel roads may be solved—by retaining the dust on the road surface, and by preventing its formation. Non-bituminous materials, such as water, calcium chloride, and sulphate liquor, and bituminous materials, such as oils and refined tars, are commonly used with varying results.

The retention of dust upon gravel surfaces is brought about by certain non-bituminous materials or light oils. The results obtained are only temporary; hence the amount that can be economically spent for such treatment is not great. These binders merely hold the dust particles together on the road surface either through capillarity or the presence of a certain binding base.

Sprinkling with Water

Water is used in cities as a rule for laying the dust on pavements. Here it may be economical, but this is not the case in the country, where water is not accessible every few hundred feet. Because of its rapid evaporation in dry weather, it necessitates very frequent sprinklings, hence it cannot be seriously considered.

Calcium Chloride

Calcium chloride is coming into quite general use as a dust preventive on gravel roads. It is available in both granular and flake form, which makes it convenient and economical for use. The material when applied to the road absorbs moisture from the air, maintaining the surface in a damp, clean and odorless condition.

It is advisable to use calcium chloride after rains when the surface of a road is in a moist condition. By so doing, better penetration is obtained. For the first application, I would advise not over one pound per square yard of surface treated, subsequent treatments being from one-half to not over three-quarters of a pound. The number of applications each year depends upon the quality of gravel on which the chloride is applied, and the character and volume of



Photographs courtesy Dow Chemical Co.

Top (left)—Applying granulated calcium chloride to a road with a lime spreader. The other two photographs show roads that received calcium chloride treatment early in the summer, and which remained dustless throughout the season

of the horses should be cleaned and greased both morning and evening.

Proper application of calcium chloride will render a gravel road practically dustless and will do away

traffic carried. Under moderate traffic, two applications a year are sufficient, while if the traffic is heavy, three may be necessary.

For distributing calcium chloride, a lime drill hauled by a motor truck should be used. The chloride is fed directly from the truck, and when in flake or possibly granular form, the material is free running and distribution is rapid. Let us assume three and one-half tons of chloride carried on a truck, the distributor having a spread of 8 feet. Then on a 16-foot gravel road, the central 4 feet being lapped, this quantity will cover one mile, applying three-fourths pound per square yard on 8 feet of the road, and 1½ pounds on the central 4 feet. This method is more satisfactory than making an even distribution the full width of the gravel, because the chloride will naturally work out.

When handling this material, workmen should be provided with rubber boots, as the chemical action of calcium chloride is very detrimental to leather. In case the distributor is horse-drawn, the hoofs and hocks

with ravelling to a large extent. This material aids in maintenance on account of holding the dust particles together, thus conserving road material. Roads may also be dragged during dry weather as well as after rains. The use of calcium chloride does not require less dragging—in fact, there is a tendency for more “chatter bumps” to develop. The continued use of chloride has a cumulative effect, and roads that have been treated will become softer during the fall and spring months than when not treated. Notwithstanding these things, the disadvantages, I believe, are more than outweighed by the good effects.

Sulphite Liquor

Sulphite liquor, which is produced in the manufacture of wood pulp, may be used as a dust preventive and binder for gravel roads. Crude sulphite liquor has little binding value, but when concentrated fair results may be had with its use. The objection to this material is that it is partially soluble in

water, and rains tend to destroy the bond, permitting the gravel to loosen, and holes soon develop.

Light Oils

Under favorable conditions certain light oils may be applied to gravel roads with fairly good results. The oils should be asphaltic in character and will serve as a dust preventive only. Frequent light applications during a dusty season, just enough to lay the dust, are preferred to a single heavy one. Should oil enough be put on the road to penetrate it, the gravel would tend to disintegrate. The first treatment should be given in the spring when the road has dried out thoroughly, the last treatment in the latter part of the summer, so that the oil will disappear by winter, leaving the road in its natural condition. If oil is allowed to get into the gravel and remain over winter, a soft condition is quite sure to follow in the spring.

Heavy Asphaltic Oils and Refined Tars

The use of heavy asphaltic oils and refined tars for surface-treating gravel roads has had considerable attention in recent years. These materials not only serve as dust palliatives, but contribute in a degree to the binding of the road surface. The lack of resistance offered by gravel roads to the trying traffic conditions now being imposed upon them is due to conditions not in the body but in the road surface.

The gravel should be particularly clean and free from clay and other dusty material. It should be as uniform as possible, not containing pockets of sand, and should approach the stability of macadam. The original condition of the road must be good. If the surface does not meet these requirements, the application of heavy asphaltic oils and refined tars is not only so much money wasted, but may result in excessive rolling and a continuity of holes.

Good results from the application of a bitumen will depend largely upon proper selection of the materials and the method of application. Special attention must be paid to detail, for neglect in one thing may mean failure of the treatment.

More consideration should be given the time of the year than has been the rule. Confine this work to the summer months only, and make applications during the warmest part of the day. The warmer the

day, the greater will be the penetration into the gravel, insuring results more satisfactory and permanent. During such a period the bituminous material will remain in a semi-liquid state longer, enabling it to get a better grip on the gravel with less liability of its peeling or picking off.

The two functions of surface treatments such as we are now considering are, first, a priming or binding action of the upper portion of the gravel, and, second, the sealing over of the surface. The first application of perhaps one-quarter gallon per square yard should serve as a primer only. Sufficient time should be allowed for this to penetrate into the road crust, then follow with the second one-quarter gallon application. A top dressing of clean pea gravel or hard stone chips not exceeding one-half inch in size should then be placed and the whole surface rolled.

There is one bituminous treated gravel road in Michigan that has commanded the respect of a good many people concerned with this subject. The work was under the direct supervision of an engineer who had made a study of the problem. The road was originally built as water-bound macadam, and in 1915, after nine years of service, what remained was shaped up and given a wearing course of gravel. During the following summer the road was given an application of asphaltic road oil, which acted as a primer and dust-layer. Early in 1917 the surface was given a treatment of refined tar, and later an application of a good grade of asphaltic oil. That was three years ago, and since that time the surface has been maintained in good condition by patching.

Bituminous materials should be applied in amounts just sufficient to seal the road, avoiding the possibility of building up a mat or heavy carpet. Additional treatments should be made only when necessary, which may prevent pushing and rolling, with which we are all too familiar.

The success of any bituminous surface treatment depends largely upon the maintenance of a surface smooth and unbroken. If this one thing might be engraved upon the minds of all highway engineers, maintenance superintendents and others connected with the care of surface-treated roads, how different things would be!

ACKNOWLEDGMENT.—From a paper read before the Seventh Annual Conference on Highway Engineering and Highway Transport at the University of Michigan.

The Growth of the Municipal Electric Plant in Bartow, Florida

By D. E. Bivins

Superintendent, Public Utilities

IN 1904 Bartow, Fla., had a population of about 1,800 and the municipality had only recently purchased from private parties the electric lighting plant, consisting of a frame, iron-clad building 30 by 60 feet, containing a 75-kilowatt generator belted to a small slide-valve, throttling type of engine. The steam generating equipment consisted of one Atlas fire tube boiler of 100 horse-power at 125 pounds pressure. Lighting service was furnished from sundown until daylight only, with frequent in-

During the year 1910 it was decided to institute a 24-hour electrical service as a convenience to the public. There being no manufacturing industries here, the most optimistic could scarcely conceive a motor load worthy of the name. Stock raising, fruit and vegetable growing, and lumbering were the occupations engaged in and the principal source of wealth in the community. The gross receipts of the combined water and light plant were about \$600 per month.



INTERIOR OF THE MUNICIPAL POWER PLANT, BARTOW, FLA., SHOWING THE NORDBERG UNIFLOW ENGINE

terruptions. Realizing the futility of satisfactory service with such equipment, it was decided to junk it and install more reliable and modern apparatus. A 125-kilowatt Bullock generator direct-connected to a 15 by 16 Skinner automatic engine and a 150-horse-power fire tube boiler, working pressure 150 pounds, were purchased and installed.

The town had been operating the water-works plant for some time, pumping water by a gasoline-engine-driven pump. A steam pump was purchased and water was pumped by steam at the electric plant.

The peak lighting load at that time reached a maximum of 85 kilowatts at 8 o'clock P. M., falling to approximately 10 kilowatts, or to street lighting load only, at 11:30 P. M., continuing constant until daylight, at which time the plant was closed down. This extremely light load over a period of several hours' operation by a unit of this size had the effect of materially increasing the fuel consumption per kilowatt in excess of the results secured during the heavier, or peak, load. There being no load that could be secured during these hours, the logical method of correcting this condi-

tion and making it possible to furnish continuous service was to install a smaller unit to take the load at 10 or 11 P. M., or at such time as the load came within its range, thereby saving at least half the wear on the larger and more expensive unit, economizing in fuel and making it possible to operate the small unit throughout the day with little or no additional fuel.

A 50-kilowatt generator direct-connected to a 10 x 10 American-Ball automatic steam engine was installed for this purpose and the real growth of the plant began from this date. A smoothing-iron, fan and small motor canvass was started, and in 1914 a larger plant became necessary to take care of the increasing load. We had now reached the stage of a permanent power plant, and the type of building and engines best suited for our conditions were thoroughly investigated. The merits of the Diesel type of oil engines were given careful consideration and, viewed from the point of fuel economy alone, appeared to have superior merit. It was necessary, however, to consider the requirements of the water-works department, especially the fire pumps, which would require motors of large capacity, seldom used, but possibly needed on peak lighting load, necessitating engines and generators of abnormal size and cost, and this excess capacity always maintained, to operate them. A combined steam water-works and an oil engine electric plant was not to be considered.

The high efficiency which may be secured on both light and heavy loads made the poppet valve uniflow steam engine appear ideal for our requirements. This type of engine was decided upon, and subsequent results confirmed the wisdom of its selection. A strictly fire-proof building was constructed of vitrified brick, with reinforced concrete roof, and floor laid with mosaic tile. A reinforced concrete stack was built, and water tube boiler, condensing apparatus, and motor-driven water-works service and steam-driven fire pumps installed. To our electrical equipment were added a 200-kilowatt generator direct-connected to a 400-horse-power Nordberg uniflow poppet valve engine, a 10-kilowatt motor-driven exciter, and a 10-panel marble switchboard with remote-control switching gear, voltage regulator, etc. The plans and specifications were drawn by E. V. Camp, C. E., of Atlanta.

After the installation of this equipment it was highly desirable that a larger daylight load be secured in order to operate at maximum efficiency. The only prospective load at this time consisted in supplanting with motors the gasoline engines that were driving irrigating pumps on the irrigated vegetable farms located a mile or more beyond the city limits. This was not a very desirable load on account of its intermittent, uncertain and seasonal character; it was decided, however, to try to take on this load, which aggregated about 100 horsepower. A rate of 4 cents per kilowatt was offered and the business secured, and the demand for power for this purpose developed very rapidly. Other industries began to materialize and, attracted by the rate offered, were connected to our lines, and our load curve began to straighten in an encouraging manner.

During the year 1917 it became necessary to again increase the capacity of the plant. A 400-kilowatt generator direct-connected to a 600-horse-power Nordberg uniflow, poppet valve engine, a 25-kilowatt, synchronous motor-driven exciter, and new condensing equipment were installed. The Bayer counter-flow, barometric type of condenser was secured, giving a vacuum of 28 inches, with a low minimum of cooling water. The 125-kilowatt Bullock generator and Skinner engine were removed and sold for three-fourths of their original cost. With the new equipment, the cost to produce a kilowatt at the switchboard was 1.73 cents. Our off-peak power rates covering motors of 5 horse-power and larger at this time was based on a sliding scale of 4, 3, 2.5 cents per kilowatt, with a minimum of 50 cents per month per horse-power of connected load. Our lighting rate was 10 cents per kilowatt, with a monthly minimum of \$1.50.

In 1920 the fuel and labor conditions became so acute that we were forced to the use of oil for fuel, which with the increase in employes' salaries almost doubled the cost of production. Some of the above-mentioned improvements and expensive line extensions having been made without a bond issue but financed by local banks and expected to be rapidly liquidated by the earnings of the plant, it was decided, effective October 1, to advance our lighting rate to 12½ cents per kilowatt, and power rate to 6, 5, 4 cents per kilowatt, with a mini-

mun of \$1 per month per horse-power of connected load. This rate was still lower than that offered in towns of similar and larger size in this part of the state.

To-day Bartow has a population of 4,800. The electric plant has a capacity of 650 kilowatts, 725 light and power customers, a connected motor load of over 600 horse-power, not taking into account motors smaller than 5 horse-power, and gross earnings closely approximating \$6,000 per month, or over \$1.25 per capita per month. Our power customers now include a fertilizer plant of 125 horse-power, irrigating plants totaling over 325 horse-power, motors for silo cutting, milking machines, printing plants, axe-handle factory, medicine manufactory, several garages and vulcanizing plants, dough-mixers in bakeries, elevators, bottling works, orange packing-houses, etc., and innumerable small motors operating sausage grinders, coffee-mills, exhaust fans, forge blowers, shoe shops, etc. Since the first of the present year our motor load has averaged above 225 kilowatts from 7 A. M. to 6 P. M., with a minimum of 150 and a maximum of over

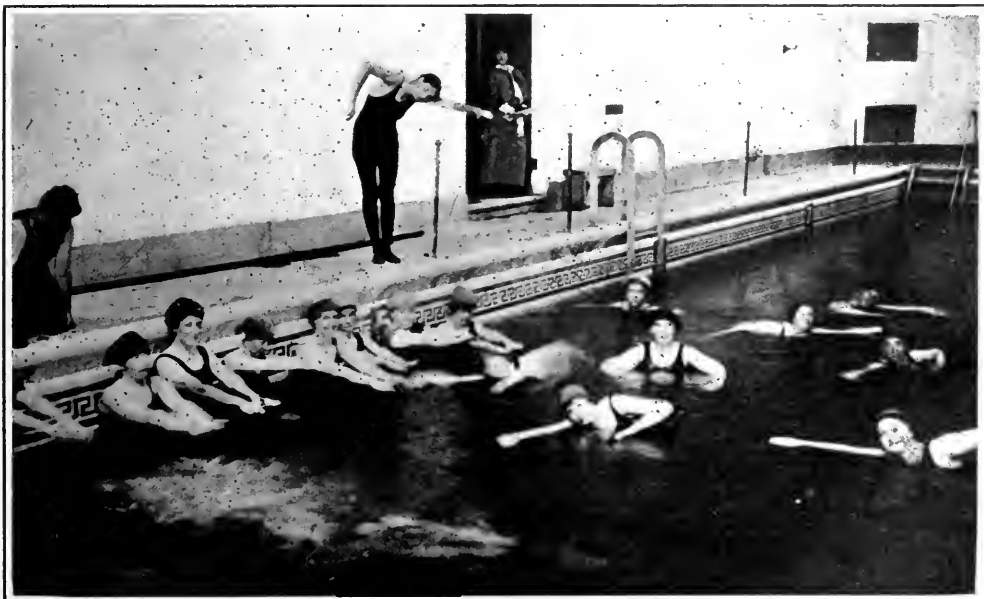
400 kilowatts. Our lighting peak load reaches a maximum of 275 kilowatts.

Our fiscal year ends May 31, and in submitting a synopsis of the auditor's report of 1920, covering the operation of the electric plant, it is only proper to state that for current used for municipal purposes, as street lighting, City Hall, Library, etc., a nominal charge is made, covering only cost of producing current and lamp renewals.

STATEMENT OF EARNINGS AND EXPENSES
ELECTRIC LIGHT DEPARTMENT
MAY 31, 1920

Earnings, Light Department:	Dr.	Cr.
Sale of current to consumers..		\$28,219.62
Current for street lighting....		3,237.00
Current for Library and City Hall		48.00
		<u>\$31,504.62</u>
Expenses, Maintenance and Operation:		
Salaries	5,527.92	
Fuel	6,981.62	
Supplies	973.83	
Interest and expenses.....	500.14	
Repairs and renewals.....	151.73	
		<u>\$14,135.24</u>
Gain from operation.....		\$17,369.38
Bond interest	2,075.96	
Sinking fund	1,422.21	
Outstanding indebtedness	1,761.08	
Extension of lines.....	7,503.22	
		<u>12,762.50</u>
Net gain from Light Department		\$ 4,606.88

Many Cities Have Municipal Swimming Pools



WHAT IS YOUR CITY DOING TO PROVIDE PUBLIC BATHING FACILITIES?

The Public Health Nurse

"When and wherever there is life to be tended, nourished or nursed, educated or saved; whether the life be yet unborn or new born, senile or ill, there is the field for womanhood exercising its great function of foster motherhood."—Sallecby, "Surgery and Society."

THE public health nurse is now often spoken of as "The Foster Mother of the Race." Whether she specializes in school nursing, industrial nursing, pre-natal and maternity care, infant and child welfare, the care of the tuberculous, venereal disease control, mental hygiene, medical social service, or whether she tries to combine these functions in generalized nursing, she is known and accepted as a friend of the people. For the past twenty years her blue uniform has been a familiar one in the city streets, particularly in the poorer districts where bedside nursing is very necessary. Within the last decade she has been included in plans for civic betterment in small towns and rural districts, and she is no longer thought of as a charity nurse.

The educational work she does in preventing illness is now accepted as a very important service to any community. City health departments, county boards of commissioners, state departments of health, are now employing public health nurses in large numbers, following in the lead of private agencies, visiting nurse associations, women's clubs, etc., which first proved that public health nurses are necessary to community health.

Many states now have laws providing for the employment of public health nurses

in towns and counties, and where there are no such regulations, the nurses are often employed as teachers of hygiene. All city health departments have their divisions of public health nurses who render assistance in preventing the spread of communicable disease, watching over the school children, making visits to the homes, locating and following up suspected cases, helping to maintain quarantine, advising parents concerning the care of their sick, and teaching the methods of maintaining health.

At many of the state capitals, the board of health has a division of public health nursing with a nurse director in charge whose duty it is to supervise and direct all public health nursing within the state. She standardizes the work of the nurses in the field, though they may be employed by various private associations. She conducts individual group and state conferences, advising the nurses concerning the plans for work, the necessity for adequate records, proper uniforms, etc.

She coöperates with Red Cross chapters, tuberculosis societies, visiting nurse associations, women's clubs, boards of education, etc., wherever they are financing work of this kind. Many times these agencies demonstrate the value of public health nursing for a year or two, after which it is taken

over by the municipal or county government. This is the aim of practically all private societies, but particularly the American Red Cross, which is at present financing, through its county chapters, thousands of rural nurses scattered over the United States. These nurses, like those employed by county governments, are furnished with automobiles, and they are often the only health workers in the county.

There is no division of public health nursing in



THE PUBLIC HEALTH NURSE IN THE SCHOOL

our National Government, but there is a Children's Bureau in the Department of Labor. The surveys made and published by this bureau show the need and value of public health nursing in reducing deaths and disease among women and children.

The Metropolitan Life Insurance Company has extended visiting nursing to its industrial policy-holders since 1911. Dr. Lee K. Frankel, in charge of the Welfare Division, has recently issued the following statistics showing the saving of lives through this service in eleven years:

"Thirty-eight thousand fewer deaths among Metropolitan industrial policy-holders in the United States and Canada during 1920 than if 1911 death-rate had prevailed.

"A decline of 23 per cent in the mortality rate since 1911; 9 per cent reduction between 1919 and 1920.

"Tuberculosis mortality 40 per cent, typhoid fever 72 per cent, acute infectious diseases of children 28 per cent, heart disease 19 per cent, accidents 26 per cent less in 1920 than 1911. In each instance a more rapidly declining mortality rate than in the general population.

"This saving of lives was accomplished by community health work, by the company's coöperation with health authorities, by visiting nursing to more than 2,000,000 cases of illness in eleven years, by distribution of over 215,000,000 pieces of health literature, and by education of policy-holders in hygiene through its agency staff."

Dr. L. Emmet Holt in the *Medical Record* for May 1, 1920, says:

"At present and for a long time to come most sick people must be treated in their homes. Even if it were desirable, it is simply impossible for any city or community to provide enough hospital beds to supply the need. It has been estimated that fully 90 per cent of sick people are treated in their homes, as against 10 per cent treated in hospitals. The possibility of taking care of very sick patients with only part-time service of a trained nurse is not yet generally appreciated either by the medical profession or the public. With



A PUBLIC HEALTH NURSE TEACHING A YOUNG MOTHER HOW TO CARE FOR HER BABY

the present shortage of nurses and the expense involved in the full time of one, or possibly of two nurses, the service of the part-time visiting nurse would seem now the best solution of the problem rather than to seek to provide for patients in hospitals."

There are at present about 10,000 public health nurses in the United States. According to Dr. C. E. A. Winslow of Yale University, at least 50,000 are needed to adequately carry out the program of preventive and curative work so much needed in America to-day. Foreign countries are looking to the United States for direction in organizing public health nursing as an important part in the post-war reconstruction work.

The National Organization for Public Health Nursing, 156 Fifth Avenue, New York City, organized in 1912, has been a valuable aid in promoting and improving public health nursing. Through its members, professional and non-professional, its magazine, *The Public Health Nurse*, its committee on education of public health nurses, its library service, its biennial meetings, its secretaries who act as advisors in all matters pertaining to organization and administration of public health nursing, the organization has been able to assist very materially in keeping up certain standards and principles pertaining to public health nursing.

It is now generally admitted that a graduate registered nurse who has had no prepa-

ration in the theory and practice of public health nursing should not be employed—except perhaps, on large city affairs where she may have the very closest direction and supervision.

There are eighteen schools in the United States where nurses receive this special preparation for public health nursing. They are connected with state universities. Through the efforts of graduates of these schools "An Equal Chance for Equal Health" is possible for many.

The human side of the nurse's work is shown in the following extracts of nurses' reports:

"After a rather bad struggle, a visiting nurse was successful in helping a young girl back from a very serious attack of pneumonia. The father, a man over thirty, had not seemed unduly alarmed even when his young daughter was worst, because, as he afterward explained, 'I knew you could do it; from the first minute I laid eyes on you coming in that door, I knew it was all right with Mary. You see, more than twenty years ago, when I was only a kid and my mother was dying with the same thing, a girl like you, with a blue coat, came in. Ma had no chance, they said, but if you want to hear her tell

about it, she is only two blocks away down the street. I have never seen the blue coat from that day to this, but as soon as I saw it, I knew that Mary was safe.'"

"School work has kept me very busy this past month, as we have had a small-pox epidemic. During the height of the epidemic more than sixty families had it. In one family the father and six children were ill, and to make matters worse, the mother gave birth to a baby boy. I urged vaccination last fall, but it took a little time before the School Board passed on it. We kept the school open—in fact, in a small town where people think less of having smallpox than of being vaccinated, it was really the safest thing, but it was work to discover all of the cases. During the height of the epidemic the City Council wanted me to investigate all suspected cases in the homes, and a machine was placed at my disposal. The mornings were spent in the schools, and in the afternoons visits were made all over town and sometimes four miles out in the country. In one place three miles out, a school child had every evidence of smallpox, the mother had thought nothing about it and had called no physician. She told me she was going to town that afternoon to visit her sister, just operated upon at one of the hospitals. Needless to say, she did not go. Rich and poor were affected alike and quarantine signs were all over town."

Connecticut Advertisises Its Motor Traffic Laws



TYPE OF SIGN PLACED ON ROADS ENTERING CONNECTICUT, GIVING AN ABSTRACT OF THE STATE TRAFFIC LAW

The Use of the Police Signal System in the Protection of Salt Lake City's Water-Supply

Salt Lake City Water-Supply Patrols Use Signal Boxes Effectively

By Charles J. Reading

Superintendent, Fire and Police Alarm System, Salt Lake City, Utah

INSTALLATION of the police signal system in the canyons from which Salt Lake City's water-supply is drawn has proved invaluable to the city. During the late war, when the sources of the water-supply were carefully guarded, this system enabled patrolmen in the canyons to keep in close touch with the city's police department and thus guard against any possible crisis.

signal system had not been installed, that branch of the water-supply would have been unprotected the remainder of the night, and the caretaker would have been found dead in the morning.

The City's Water Sources

The water-supply for the city of Salt Lake is obtained from near-by canyons—City Creek, Emigration Creek, Parley's Creek



CAPITOL HILL RESERVOIR, SALT LAKE CITY, SHOWING STATE CAPITOL BUILDING IN THE CENTER, AND CARETAKER'S RESIDENCE, WITH POLICE SIGNAL BOX AT RIGHT

Only a few months ago the caretaker at the Twentieth Ward tank in City Creek Canyon was taken violently ill in the night. He immediately notified the operator at the central police desk. Before the conversation was finished the caretaker fell unconscious. Other members of the department were rushed to the scene and the man was found in a dying condition. If the police

and Cottonwood Creek. All these sources being far above the city, the water is distributed by gravity through the city mains from the high line in City Creek Canyon, the reservoirs at Thirteenth and Fifteenth East Streets, and from the intake in Parley's Canyon. About 25 miles east of the city are the Cottonwood Lakes. These have been converted into natural reservoirs and

furnish their quota of the water used. The dam in Parley's Canyon will be enlarged soon by building the second unit of 40 feet.

During the year 1920 the Parley's high line conduit and the Sunnyside pressure line were completed, and these increased the capacity of the supply lines to the city by approximately 40,000,000 gallons per day. The city had been in need of this improvement for a great many years, as the capacity of the conduit from the Parley's and Big Cottonwood sources was not sufficient to supply the demands or to carry the necessary water even when it was available. The supply of water from these sources had heretofore been limited to the amount that could be carried in the old Parley's conduit, which was built in 1888 with a carrying capacity of only 17,000,000 gallons per day, and the Twenty-seventh South supply line with a capacity of 12,000,000 gallons per day.

The new Parley's high line conduit connects on the Big Cottonwood conduit on the south side of Parley's Canyon, and syphons across the canyon, carrying the supply to a point near the mouth of Emigration Canyon. From this point it is delivered through a 30-inch cast iron pipe to distribution reservoirs at Thirteenth East Street and Fifteenth East Street.

At each of the reservoirs and intakes, with the exception of the Cottonwood Lakes, the water-works department has tank men on duty at all times. It is now planned to place three shifts of men on duty at the lakes in the near future.

Policemen patrol the canyons, from which the water-supply is drawn, at all times. It is their duty to keep campers at safe distance from the streams and to guard against the pollution of the water by horses, cattle and sheep. In the summer, when the canyons are full of pleasure-seekers, this requires careful attention to duty, and the patrolmen must be able to establish quick communication with the head office of the water-works department.

The Lines of Communication

To make such quick communication possible, police boxes have been placed at all reservoirs and intakes. These are connected with the main fire and police alarm office, then through a relay to a recording set in the office of the superintendent of water-works. This set registers the box number and stamps the time of registration. The

boxes have a complete telephone set, so that conversation between the superintendent's office and any station may be carried on at any time. All tank men and patrolmen are required to report in each hour and they may be called by a bell rung from the central office.

On the central police desk at the main office there are three direct lines: one to the office of the superintendent of water-works; one to the shop of the water-works department; and one to the emergency station, where men are on duty at all times. All the work of the system is carried on over these lines. This enables the superintendent of water-works to direct the operation of the entire system through these lines and the police boxes, giving him control of all employes at all times. The system has proved such a success that it is the intention of the Commissioner of Water-Works, C. Clarence Neslen, who is also Mayor of the city, to extend these lines of communication to the Cottonwood Lakes during the present year. If this is done, it will mean the placing of ten more police boxes on that line of the system.

This system of communication for the water-works department was made possible when the City Commissioners installed the Gamewell Company Type B police desk at the fire and police alarm office. Its operation by regular employes of the alarm system enables the city to maintain the water-works branch at a nominal cost.

The entire system comprises: the central desk; the recording set in the superintendent's office; 20 miles of line constructed of No. 12 galvanized iron wire; four miles of underground cable; and eleven police boxes. The recording set in the superintendent's office consists of one Ideal punch register, one Gamewell time stamp, and one take-up reel. Taking into consideration the service that has already been derived from this system in increasing the efficiency with which the work of the department is handled, it can readily be seen that it will pay for itself in a very short time.

Besides enabling the superintendent of the water-works department to keep track of the activities of the men in his employ, the signal system makes it possible for the caretaker at the Capitol Hill reservoir, a picture of which accompanies this article, to call from his residence and regulate the volume of water supplied to the city water sys-

tem from the branch under his control. This is also true of the other caretakers. Formerly they were obliged to make their reports and issue their orders in person, thus losing much valuable time.

A Quick Call and a Quick Response

Most of the reservoirs and conduits are located in the heart of the rugged mountains, several miles from the city. Before the signal system was installed, the patrolmen in these mountains and canyons had no way of calling assistance to their aid if anything should go wrong. If they were obliged to make any arrests in the performance of their duties, they had to handle their prisoners alone in the best manner possible. Under the present system, they have merely to notify the operator on the central desk at police headquarters and a patrol wagon load of officers is rushed to their assistance.

The system has proved invaluable also in guarding against grass and forest fires in the summer time. Whether Salt Lake City's water-supply is high or low in the summer depends to a great extent on the amount of snow stored in the hills in the winter. A heavy growth of grass and underbrush tends to hold the snow and prevent it from blowing off the hills or melting so rapidly that it simply runs off in a torrent and fails to soak into the ground. These growths of grass and brush cover the watersheds, and great care is taken in the dry months of summer

to prevent them from being destroyed by fire.

Since the installation of the police signal system, the work of protection has been much easier than it was before. Prior to that time, patrolmen in the canyons, upon discovering a fire, were obliged to ride to the nearest telephone, perhaps a couple of miles away, and notify the superintendent of water-works of the impending danger. At present the patrolmen simply go to the police box, and the notification is practically instantaneous. In a few minutes a large number of men from other points of the system are on the way to fight the fire which is menacing the watersheds. In this way the signal system has been instrumental in avoiding much harm to the watersheds.

An interesting Indian legend has been woven about "Suicide Rock," shown in the cover design for this issue of THE AMERICAN CITY. Years ago, so the legend says, a beautiful Indian maiden whose brave had been killed in one of the many fierce wars waged in this vicinity, used to wander daily to this rock and use it as a lookout station, from which she would scan the surrounding country for sight of her loved one. Day after day she repaired to this rock, refusing to believe that her warrior had met his death. Finally coming to a realization of the truth, she threw herself from this ledge and was dashed to death on the rocks below.

A Toast to Water

A Southern colonel at a banquet in Arkansas offered the following toast to "water."

"Water—the purest and best of all things that God created. I want to say to you that I have seen it glisten in tiny teardrops on the sleeping lids of infants. I have seen it trickle down the blushing cheeks of youth, and go in rushing torrents down the wrinkled cheeks of age. I have seen it in tiny dewdrops like polished diamonds when the morning sun burst in resplendent glory o'er the eastern hills. I have seen it in the rushing stream rippling over pebbly bottoms; in the river rushing over precipitous falls to join the mighty Father of Waters, and I have seen it in the mighty ocean on whose broad bosom float the battle fleets of all nations and the commerce of the world—but, ladies and gentlemen, I want to say to you now, that as a beverage it's a damned

failure."

We, too, have seen it on the mighty ocean shores choked with garbage, rubbish and decayed fruits, a menace to the health of bathers and the men who man the ships of commerce and of war. We have seen it in the mighty Father of Waters supporting bodies of dead animals, raw sewage and other filth. We have seen it in the placid river and in the roaring falls, carrying camp refuse, decayed vegetation, tin cans, papers and spoiled food. We have seen it in the trickling springs where lowly cattle cool their feet and in still pools where mosquitoes come to life. We, too, have seen it on the weary lids of sick children, fevered youths and old folks, on their noses and their mouths, and we want to say now and here that—you are right, colonel; as a beverage it is a damned failure—unless you know it's pure.—*California Health Bulletin.*

Conditions Under Which Guard-Rails Should Be Used on Highways

By William W. Cox

Engineer-Manager, St. Clair County, Mich.

SINCE the advent of the automobile as a means of transportation, and since the more recent development of the motor truck as a means of hauling freight, many new problems have confronted road builders. As the volume, weight and speed of traffic increase, the road builder must increase his efforts to meet those conditions, so that the maximum service may be obtained in the use of our highways.

New and revised laws are enacted to regulate speed and weight, new and more rapid means of construction are adopted to facilitate the completion of roads, stronger foundations and better surfaces are designed and constructed, new alignments are being made, all for the purpose of improving our highways.

Notwithstanding the advances in legislation, design, and construction, have not road builders overlooked the necessity of providing proper safeguards for the protection of life and property? Has the subject of safety been studied sufficiently so that under certain conditions we make guard-rails an important part of our construction requirements?

It is conceded by the writer that the use of guard-rails will not entirely solve the problem of protection, but it is well to examine the conditions under which they can be used to advantage.

Where Accidents Are Likely to Occur

On roads where the hard surface or traveled way is narrow, say 9 feet wide, and the grade is 20 to 24 feet wide, where the shoulders or berms are of light sand and soil, or where they are of heavy clay, many accidents are sure to result by skidding when vehicles pass. Especially is this the case with fast-moving and heavy vehicles. This skidding and upsetting in the ditch may be attributed to the carelessness of the driver, but—have you ever driven a speedy automobile or a heavily-loaded truck on soft or slippery shoulders? If you have, you will agree that even though



AN UNUSUAL TYPE OF GUARD-RAIL OF HEAVY TIMBER AND WIRE ROPE

average care and judgment are used, accidents are sure to occur where narrow surfaces and poor shoulders exist. These accidents may be more or less expensive, even if not fatal. Fatal accidents usually result when the ditches are deep or when the fills are high. As a general rule, it is considered advisable to use guard-rails where the ditches are over 4 feet deep and where the fills are over 4 feet high.

On roads where the traveled track or hard surface is 16 feet wide and the grade is 24 to 30 feet wide, accidents are not numerous unless the surface is rough and the traffic is congested. As traffic increases, we find that the number of accidents increase proportionally.

On roads where the traveled track or hard surface is wide enough to accommodate traffic, so that vehicles may pass freely and without getting off the surface to do so, the danger of skidding to the ditch is elimi-

nated. This holds true except when rain, snow or ice literally greases the skids.

All roads, by virtue of their traffic conditions and of the difficulties encountered in their design and construction, have their danger points and death-traps, where protection should be provided.

Points Where Protection Is Needed

The most common of these is found in flat clay sections where deep drains become imperative for the improvement of the road and the adjacent farm lands. These ditches vary in depth from 3 to 12 feet and very often follow along the road for miles. In these sections we find the customary township line offsets where existing drain improvements prohibit new locations. Where

they are long and easy, or short, and whether they are connected with long or with short tangents, they are the most hazardous when they occur on a steep gradient. Without question, curves in hilly territories should be guard-railed properly. But why do we place danger signs if we also advocate guard-rails? We place danger signs as a warning, and guard-rails as a guide for the stranger and as an added safeguard even though curves are wide and easy.

Approaches to bridges and culverts should also be protected. More especially is this true when the roadway is narrowed in these structures or when high waters are likely to disturb the hills.

Guard-rails should always be used when



A STURDY SET OF GUARD-RAILS AT A BAD CURVE IN THE ROAD

intersecting roads or right-angle turns must remain near these ditches, it is necessary to protect the corners or turns.

In the rolling or hilly sections high fills must be made in order to reduce the grades. These fills, either of sand or clay, are subject to washouts and settling, thus becoming dangerous when over a few feet high unless they are made exceptionally wide. Even the wide grade is treacherous if it is located on a steep gradient. In hilly territory we also find the majority of curves which cannot well be eliminated. These curves may be connected with long or short tangents. They may be long, easy curves, or they may be short and sharp. Where possible, they should be superelevated and widened within reasonable limits. Whether

a question of safety is involved, and when used they should be made strong and substantial. They may be constructed of rock in places where proper rock is obtainable to make a good, strong, pleasing rock wall. Reinforced concrete may be pre-cast and assembled into one firm, strong, pleasing structure.

The guard-rails which are most common in Michigan are constructed of timber. They should be built of 8-inch cedar posts placed not more than 8 feet apart. The posts should be in the ground not less than 3 feet, or deeper in loose soils. They should be placed not at the outer edge of the berm or shoulder, but within it, and at least one foot from the beginning of the side slope. The side-rails, usually three in number,

should be of good, clear lumber, not less than 2 inches thick and 8 inches wide. These should be thoroughly spiked and lag-screwed to the posts. The lower rails should be on center a distance of 15 inches from the ground. The top rail should be placed on top of the post so as to show up well, to strengthen the structure, and to protect the top of the post from decay. The height of the structure should be not less than 3 nor more than 4 feet. The whole should be painted with a good grade of white lead oil paint.

When Guard-Rails May Be Omitted

Perhaps you have been designing and constructing your roads, bridges and culverts so as to eliminate the guard-rail wherever possible. It may be well to consider also how this may be safely done.

Where there are deep ditches and sharp turns, it is found better in many instances to purchase additional rights-of-way. The roads can then be built with wider grades and at a safe distance from the ditches.

At the present price of guard-rail, one mile would cost five or six thousand dollars for one side of the road. This sum would in many cases pay for the rights-of-way and also provide for the wider grade. Usually culverts can be made the full width of the grade with moneys which would be put in guard-rails.

After eliminating them wherever it is possible to do so economically, there still remain places that should be guard-railed. If road builders consider their responsibilities seriously, they should give to the public every reasonable means of protection; whenever accidents occur on highways, they should be able to feel that they are not guilty of negligence. The traveling public, as well as the public at large, are looking to them not only to build roads but also to make all roads safe under reasonable conditions.

ACKNOWLEDGMENT:—From a paper read before the Seventh Annual Conference on Highway Engineering and Highway Transport, at the University of Michigan.

The Prevention of Fly-Breeding

In the Panama Canal Zone, in spite of its all-the-year warmth, there is often not even one fly in a house. The scarcity of flies in the Canal Zone is the subject of frequent comment on the part of visitors.

The methods of getting rid of flies are based on the fundamental principle and practice of preventing their breeding. Streets and grounds are kept clean. Garbage cans are kept covered, garbage is collected daily, and the cans are cleaned with larvacide. In the stables manure is gathered quickly and dumped into compost pits, where heat and the chemical action of fermentation render the manure unsuitable for breeding. There are no old-fashioned privies in the towns, and in the field work, field closets are placed over deep pits, frequently treated with crude oil and larvacide. "Swatting the fly" is practiced through fly-paper and traps; but the fundamental idea is prevention at the source. Such are the basic practices to prevent fly-breeding. They are possible only in a well-organized community, and at the price of continuous effort.

The detail to which this work must go is illustrated by this report, sent in by the district sanitary inspector at Balboa under

date of March 10, 1921:

We have always had more or less flies at Balboa restaurant; our reports usually show "few," "very few," "decreasing," or "increasing." From time to time we find small breeding-places, but have never felt satisfied that the real breeding-places had been found until yesterday, when breeding was found in the inner parts of about 12 old grease-soaked corn brooms used for sweeping the floors, platform, and street at Balboa restaurant. In some of these brooms as many as 200 maggots were found, some puparia being found higher up in the dry parts. This has been reported to the chief steward, who will see that the brooms are steamed hereafter to prevent further breeding.

The importance of the prevention of flies lies not only in the removal of a pest, but also in greatly diminishing the danger of infection with typhoid fever, dysentery, and other diseases. In keeping down the number of flies, as in the anti-mosquito and anti-rat work (which are aimed primarily at the prevention of yellow fever and malaria, and of bubonic plague, respectively) the Health Department counts on the intelligent and loyal coöperation of the residents of the Canal Zone. Especially in the work against flies and rats, cleanliness about the quarters is essential.

—Panama Canal Record.

Modern Methods of Water-Supply and Purification—Part I

By M. F. Sanborn

Sanitary Engineer, M. Am. Soc. C. E.

EDITORIAL NOTE:—The happiness, growth and prosperity of a community, village or city depend, more than on any other thing, on the purity, character and quantity of the water furnished by the public water-supply.

THE uses of water in a city are many—the domestic uses, including drinking, cooking, washing and laundry, fire protection, industrial, and various public uses, such as street cleaning, sewer flushing, fountains and lawn sprinkling.

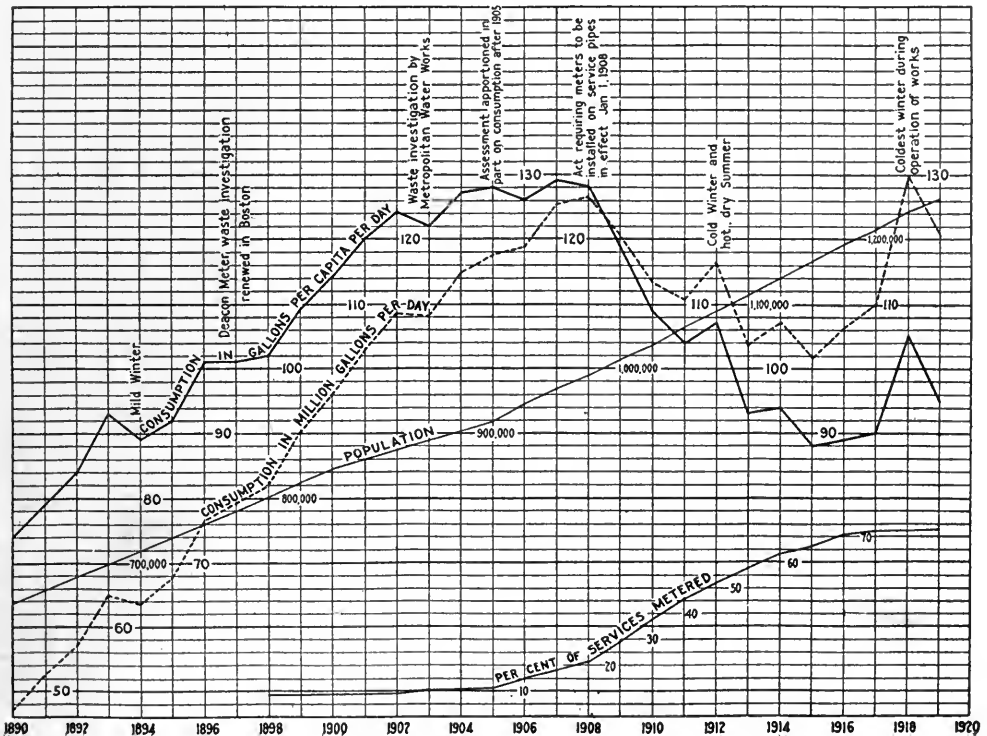
For domestic purposes the purity of the water is of the utmost importance. It is assured in some cases by using sources free from pollution or possible pollution, but generally by some form of filtration or disinfection, or both. The water should also be as free as possible from color and turbidity,

and be moderately soft, especially for washing and laundry purposes.

For fire protection the prime requisites are quantity and pressure. The first is obtained by having mains of sufficient size, a proper number of hydrants, and a reserve supply such as is provided by natural or artificial reservoirs; the second—pressure—is obtained from reservoirs, by pumps or by fire engines, or by a combination of these.

Some industries need a water of certain characteristics, and must employ special treatment to obtain it, but practically all in-

POPULATION, CONSUMPTION OF WATER AND PER CENT OF SERVICES METERED
IN THE
METROPOLITAN WATER DISTRICT
AS SUPPLIED IN 1919
FROM 1890 TO 1919



106503

PA-283

dustries require a water nearly free from color, turbidity, hardness, and any salts or acids which form boiler scale or cause foaming or pitting of boiler tubes.

The water used for other public purposes than drinking does not need to be of such high standards as given above, especially when used for street flushing, sewer flushing, etc., although it is customary to supply for such purposes the same water that is supplied for domestic use.

Dual Water-Supplies

Dual supplies drawn from two or more sources and used for different purposes, while never desirable, are sometimes necessary. The following are some of the combinations found: very hard water from public supply and rain water collected at various houses for washing and laundry; a satisfactory public supply, and a separate or partially separate supply, generally from a polluted source, for fire protection. Sometimes polluted water is used for fire protection, flushing toilets, etc., and well water for domestic purposes. In some cases cross-connections are found, and serious epidemics have occurred due to the polluted water entering the distributing mains of the regular supply.

Consumption of Water

The amount of water used daily, which for comparative purposes is generally expressed as consumption in gallons per capita per day, varies greatly and will range from a minimum of about 15 to a maximum of 300 gallons or more. This variation is due to many causes, such as age of distribution system, care in detecting leakage and waste, temperature (extreme cold in winter and heat in summer), metering of individual supplies, industrial uses, public uses, and wastage of water by householders or industries.

In a community where all supplies are metered, the metered consumption at different places varies from about 15 gallons to 50 gallons per capita per day, while the unmetered consumption, or that portion of water unaccounted for, varies from 30 to 200 per cent of the metered consumption. The effect of the reduction of consumption per capita per day due to the use of meters may be graphically seen on the diagram showing the consumption and per cent of services metered for the Metropolitan Water District of Boston, which includes Boston

and surrounding cities from 1890 to 1919. This diagram shows a reduction in the consumption per capita per day from about 129 gallons during the years 1904 to 1908 to slightly over 90 gallons during the last seven years, when about 70 per cent of the services were metered. This reduction in the consumption is a common experience where meters are installed, and with a complete meter service the reduction will be much greater. The amounts used for public purposes such as fire fighting, flushing of streets and sewers, fountains, etc., while at times considerable, will not average more than from 2 to 10 gallons per capita per day.

The Distribution System

The pressure should be between 45 and 100 pounds per square inch, and preferably from 60 to 80 pounds. A pressure lower than 45 pounds is not suitable for fire protection, and one greater than 100 pounds causes considerable leakage in mains and fixtures and necessitates more costly, heavier plumbing.

The pipes of the distribution system should be of sufficient size for the ordinary needs of the community, for fire protection, for probable future extensions, and in no case less than 8 inches in diameter where a hydrant is to be installed. A maximum short-time consumption of about three times the average consumption should be allowed for.

Two- and sometimes three-way fire hydrants are generally placed at street intersections, and in long blocks they are placed between street intersections. A fire hose 450 to 500 feet is considered the maximum length for effective work.

Sources of Supply

Water for public supply is obtained from rivers or brooks, lakes, springs, shallow and deep wells, and infiltration galleries, and in addition is frequently filtered or disinfected, or both.

Where the flow in a river is at all times greater than the maximum possible consumption or pumping capacity, the water may be pumped or fed direct to the water-mains or filters or reservoir, but where this is not the case, impounding or storage reservoirs, and in some places distributing reservoirs, are provided to hold the surplus water during periods of maximum flow in rivers for use during the dry periods,



REMOVING DIRTY SAND FROM THE SURFACE OF THE PROVIDENCE, R. I., SLOW SAND FILTER, ALSO A PORTION OF A COVERED FILTER

Springs and shallow wells are developed by the construction of permanent spring or well houses, care being taken to prevent surface waters from entering supplies. Because of the limited amount of water generally available from these sources, they are satisfactory only for small communities.

Deep wells are driven or drilled through earth or rock to a water-bearing stratum and are from 40 to 1,000 feet or more deep. Sometimes these are flowing wells, but more often the water has to be lifted from the wells by ordinary pumps, deep well pumps or air lift.

Supplies are occasionally developed by the construction of underground galleries of porous material in such a way as to intercept the underground flow, or in a water-bearing stratum, as in a sand-bar in a river.

In all cases of proposed supplies, and of improvements or extensions to existing supplies, a thorough study by a competent expert should be made of the several sources, and the supply to be used should be determined as the result of such study, which should include the following factors: purity of water, possibility of contamination, need of filtration, quantity available, elevation of source in reference to point of consumption, which determines need of pumping and cost of developing, including need of storage. Study of the quantity available should include measurements of flow of river over a long period, especially during the dry season, and pumping tests of wells, springs, etc. The U. S. Geological Survey, the Weather Bureau, and frequently some of the state commissions, have considerable information as to stream flow, underground flow, maximum, minimum and average tempera-

tures, and precipitation, which are available to anyone and are useful in the consideration of proposed supplies.

Analysis of Water

The purity of the water is determined by chemical and bacteriological analyses and inspection of sources of supply and watershed as to existing and possible pollution. The chemical analyses should be complete and cover the determination of presence of objectionable minerals, salts, odors, acids, etc., as well as past or present pollution. The bacteriological analyses should show the presence or absence of *B. coli*, as well as giving the total counts. The results of the analyses and of the inspection will determine the need of filtration or disinfection or both.

Many of the larger water departments maintain extensive laboratories where the purity of both the raw and the treated water is tested at frequent intervals by chemical and bacteriological analyses. In any water-supply presumptive tests for *B. coli* should be made regularly to determine whether the water is receiving any pollution, and in case of treatment the efficiency of the treatment may be determined by comparing the tests of the untreated and the treated waters.

Iron in the water is apt to stain clothing and be objectionable on account of the precipitate which sometimes forms. Excessive hardness makes it unsatisfactory for washing and laundry purposes and produces scale in boilers. High nitrates in waters stored in uncovered reservoirs generally facilitate the growth of objectionable algae, diatoms, etc., and with lime present, *Chara* may grow in

shallow reservoirs and give an unpleasant odor to the water.

Where pumping is required, the first cost and the cost of maintenance are considerably increased. In cases where the elevation of source is sufficient, it is possible to operate the entire system by gravity, and where elevation is considerable or the flow great, it may be possible in the development of the supply to utilize the surplus water, or even the water to be used for domestic purposes, for water-power.

Open and closed reservoirs, elevated tanks and stand-pipes are used for the storage of water for a reserve supply to use during emergencies, fires, and for periods of low flow, and also to maintain a satisfactory pressure in the distributing system. Reservoirs are constructed on top of hills, on the side of hills, or by building a dam of suitable material across a valley, thus causing the river water to rise to the elevation of the dam or spillway. When a reservoir is built on the side or top of a hill, it is generally built of concrete, stone, or brick masonry, or other impervious material.

Purification

Water is purified or partially purified by plain sedimentation, chemical precipitation, aeration, slow sand filtration, rapid sand or mechanical filtration, disinfection, water

softening, and treatment with copper sulphate to kill algae, diatoms, etc.

Plain sedimentation is sometimes of assistance in removing suspended matter from turbid waters, and if they are exposed to sunlight the action of the sun is particularly beneficial, as it somewhat reduces the number of bacterial and other impurities. Sunlight, however, on waters high in nitrate is objectionable, as it increases algae, etc.

Sedimentation with the aid of chemicals is used with turbid and colored waters especially as a preliminary treatment for rapid sand filtration, in which case the preliminary sedimentation extends somewhat the interval of time between filter cleanings.

Aeration of some waters is of benefit in increasing dissolved oxygen and reducing carbonic acid gas. It also removes to a large degree the odors caused by stagnation of that water which is drawn from below the zone of rapid change of temperature, since this water, mixing but slightly with the upper water, contains little or no dissolved oxygen. It assists in removing odors and tastes caused by microscopic organisms, and certain forms of these organisms are considerably disintegrated by the aeration. Aeration is also of benefit in causing some forms of iron to precipitate, after which the iron is easily removed by sedimentation and rapid sand filtration.

Municipal Library Expenditures and Circulations

Reprinted from the Handbook of the District of Columbia Public Library

CITIES (ranked according to census)	Population Census of 1920	Expenditures 1919 or 1920	Per Capita Expenditures	Expenditures Per Vol. Circulated	Per Capita Circulation Volumes
Detroit	993,739	\$552,415.18	\$0.555	\$0.259	2.14
Cleveland	796,836	536,108.91	.672	.154	4.36
*Cincinnati	493,678	256,336.14	.510	.139	3.72
*Minneapolis	415,419	178,166.76	.428	.110	3.88
Kansas City.....	324,410	145,879.15	.449	.165	2.72
Seattle	315,652	241,119.54	.763	.148	5.15
Indianapolis	314,194	153,813.52	.489	.197	2.47
Jersey City.....	297,864	96,920.73	.325	.091	3.54
Rochester	295,850	96,134.98	.325	.088	3.66
*Portland	275,898	188,946.55	.684	.128	5.33
Denver	256,369	95,000.00	.370	.102	3.62
Toledo	243,109	119,035.42	.489	.122	4.00
Providence	237,595	139,438.63	.586	.318	1.84
Columbus	237,031	37,278.00	.157	.150	1.04
Louisville	234,891	98,752.40	.420	.099	4.22
St. Paul.....	234,595	161,535.22	.688	.160	4.29
Oakland	216,361	135,686.40	.627	.148	4.21
Average .....			.503	.151	3.54

* City and county.

Asphaltic Roads in the Canal Zone

The Government Specifies Asphaltic Concrete and Sheet Asphalt for Main Roads

IN building the highways to connect the civic centers of the Canal Zone, the Government has carried out its intention of surrounding the Canal with construction of the most modern and highest class. The road engineers in the Canal Zone have first of all given deep consideration to those cardinal principles of road building: (1) the preparation of the subgrade; and (2) the provision for proper drainage. First of all, the soil of the subgrade was analyzed, and when being prepared to uphold the foundation course it was packed and rolled carefully, so as to procure the greatest possible density and compactness.

Closely allied in importance with the preparation of the subgrade was the provision for proper drainage. This was effected through the placing of culverts, the extension of drains, and the building of other means for carrying off excess water and moisture. An example of the care taken in providing proper drainage was at the Corundú River, crossing along the new asphalt highway from Balboa to Diablo. The culvert at this point was extended and im-

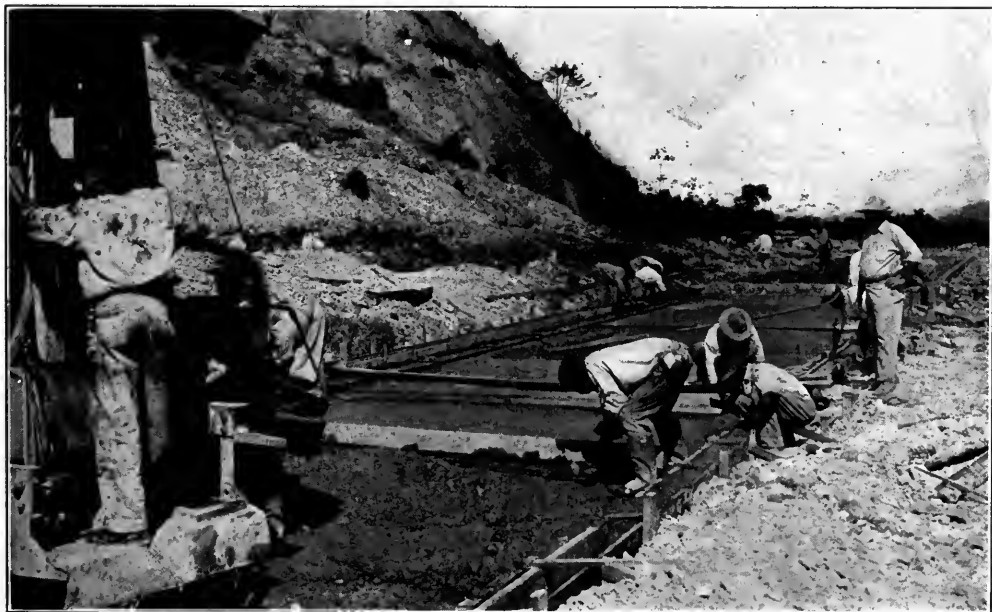
proved, and a small retaining wall was built to keep the excess water from flowing back into the subgrade and under the roadway.

Concrete Base for Asphalt Top

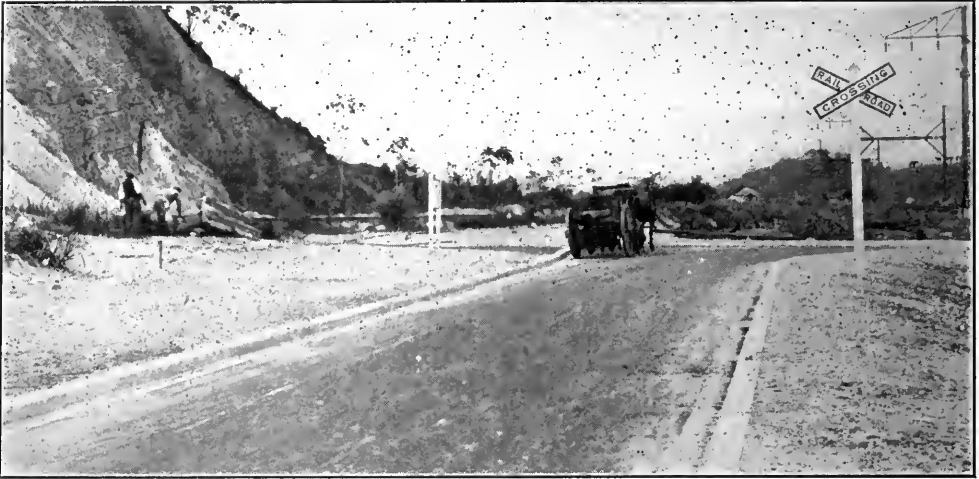
The cement-concrete base for the asphalt wearing surface was mixed to contain 1 part cement to 3 parts of sand and 6 parts of stone. Six inches was the thickness of the base. A portable concrete mixer was used, and the illustration shows the method of constructing the base. The ponding system was used to cure the concreté, which was smoothed to a proper degree to within 2 inches of the surface of the cement gutter.

The Wearing Course

So as to insure a durable, resilient wearing surface that would undergo the heavy traffic and at the same time withstand the torrid sun of the Canal Zone, the engineers specified a sheet asphalt wearing surface to be laid over the concrete base. Texaco asphalt of a 45-50 penetration was used, mixed with local sand. A typical analysis of the native sand, as made by the Department of



PLACING AND FINISHING A 6-INCH CEMENT-CONCRETE BASE ON THE DIABLO ROAD, CANAL ZONE, PANAMA, BEFORE LAYING THE SHEET ASPHALT TOP



CONCRETE ROAD WITH SHEET ASPHALT WEARING SURFACE FROM BALBOA TO
DIABLO, CANAL ZONE, PANAMA

Operation and Maintenance, shows the following:

Passing 200-100-80 mesh screens.	24.8%
Passing 50-40 mesh screens.....	12.9%
Passing 30-20-10 mesh screens...	28.0%
Passing 1/4-inch screens.....	25.8%
Passing 1/2-inch screens.....	8.5%

The Ancon-Pedro Miguel Highway, which connects two of the civic centers of Panama Canal Zone, was paved in 1919 with sheet asphalt over a cement-concrete base. The

Diablo Road, which is one of the main highways of the Zone, is paved in the same manner, and the municipality of Pedro Miguel has several streets of asphaltic concrete which were built in June, 1919. These modern pavements form only part of the Government's extensive plan to construct the highest types of highways in the Canal Zone to connect the various towns for automobile traffic.

Street Obstruction by Automobiles

A Potential Danger in Every American City

THE choking of our street areas by the parking of automobiles and the difficulty of clearing the streets for the operations of the fire department in case of a big, quick-spreading fire, is a matter which must be seriously considered by municipal officials. Most cities prohibit parking at the curb within 25 or 30 feet of a hydrant, but this does not relieve the street of congestion which often dangerously delays the fire apparatus in responding to down-town fires; nor does it relieve the firemen of the necessity of wasting precious moments in moving parked automobiles to make room for an effective handling of the apparatus. To safeguard cars against theft special locks are provided, and when a fire occurs, the owner of the parked car, the only person

able to unlock it, may be at a matinee or in some remote part of the city.

The operated cars themselves present a sufficient impediment at certain moments, as was sufficiently demonstrated at a spectacular fire in Salt Lake City last year, which occurred about shop-closing time and attracted such a number of spectators in automobiles as to close several avenues of approach to second-call apparatus. Although but a few blocks away, the trucks dodged about for 15 minutes before gaining access to the fire area. This matter of street congestion is one to which traffic experts may very well give most careful attention. There is untold potential danger in it to every city in North America.—From *National Fire Protection Association Quarterly*.

Forward Steps in Municipal Affairs

Police Departments

Effective Police Protection for Residential Sections

KANSAS CITY, Mo.—This city extends over a large area, and a goodly portion of the residential districts is rather thinly settled, making it almost impossible to police them with men on foot. In order to meet this situation the Police Department has established a system of police booths. These are installed at the center of a residence area, say about one-and-a-half miles square. Each booth contains two telephones, one a police signal phone, and the other a private phone with its own number.

As soon as one of the booths is ready for operation, letters are prepared and distributed by police officers to all the citizens in the district which the booth is to serve. These letters describe the service and con-

tain a card on which is the telephone number, with instructions to the citizen to place this card in his telephone book so that if he needs a policeman in a hurry he can call direct to the booth, without having to go through the regular police switchboard.

At these booths there are stationed two motor-cycle men at all times of the day and night, and between the hours of 10 P. M. and 4 A. M. there are four men on duty. Between the hours of 4 A. M. and 10 P. M. one man stays in the booth, while one man patrols the district on a motor-cycle. Between 10 P. M. and 4 A. M. two remain in the booth, while two patrol the district, one on the motor-cycle and the other in the side-car. Riot guns loaded with buckshot compose part of the equipment of each motor-cycle.

There are two motor-cycles assigned to each booth, both equipped with side-cars, which makes them usable in wet weather, and at the same time permits the carrying of an extra passenger.

The protection afforded the districts in



WHEN THIS SYSTEM IS COMPLETELY INSTALLED, A POLICE OFFICER WILL BE AVAILABLE AT ANY PLACE IN KANSAS CITY WITHIN THREE MINUTES

which this system has been in operation has been excellent. Night prowlers and burglars have been practically eliminated from the neighborhood. The police are enabled to keep track of all strange motor-cars that come into the district and stay for any length of time. In addition, the psychological effect on the citizens has been very good, as they know that there is a police officer at a certain place, whom they can reach on short notice.

These booths are all located at intersections of principal thoroughfares so that calls from any direction can be quickly answered. The plans include the locating of these booths throughout all the residential districts, so that, working in conjunction with the police stations, they will make a police officer available in any part of the city within three minutes' time. In addition, booths have been located on the principal highways leading out of the city, so that at any desired time practically all exits can be closed to shut off escaping highway-men.

The men stationed at the booths are also useful to motorists, as road maps and instructions can be found in all booths.

At the present time there are in the Kansas City Police Department 75 motor-cycle patrolmen and 40 motor-cycles with 25 side-cars.

MATTHEW A. FOSTER,
Police Commissioner.

Public Welfare Departments

A New Angle on the Immigrant Problem

CINCINNATI, OHIO.—This city is probably more free from the perplexing problems of immigrant colonies among its population than any other of the large cities. The percentage of foreign-born population in Cincinnati is only about 8 per cent—a smaller percentage than that in any other city of its size.

During the period of the war, when immigration was almost completely stopped, the American House, located in the midst of Cincinnati's immigrant district, had an excellent opportunity to forge ahead with its work of bringing its neighbors into con-

tact with American ways and standards of living. Much intensive work was done during these years that could not have been done while there was a constant stream of immigrants entering the city.

When the new immigration began, after the signing of the armistice, the social agencies in Cincinnati and the Department of Health determined that the new immigrants should be taught their rights and their obligations at the very beginning, before they had a chance to develop bad habits.

In November, 1920, a joint plan of follow-up was worked out by Community Service, the Board of Health, the Better Housing League, and the Americanization Committee. These four organizations determined to see to it, first, that every newcomer is free from communicable diseases; secondly, that he and his family know how to live according to American standards of living; and, finally, that he and his family are at once put into touch with facilities for learning the language of this country and becoming citizens.

Every alien that comes into the city is met at the station by the Travelers Aid Bureau of Community Service. The Bureau gets his pedigree and the address at which he and his family are going to live. That information is recorded on a special card which is forwarded to the Department of Health. There a physician gets in touch with the immigrant and examines for communicable diseases and for serious physical defects, taking the appropriate action if any such diseases or defects are discovered.

The card then goes to the Better Housing League, which at once dispatches one of its visiting housekeepers to investigate the housing conditions. If the family is badly housed or is overcrowded, the Visiting Housekeeper sets out to remedy the condition.

The final spoke in the wheel is the Americanization Committee, which upon receipt of the card takes steps to persuade the family to learn English and to train for citizenship.

And so, instead of the community's becoming burdened with a never-ending problem of new groups of aliens settling down in filth and disease and remaining in complete isolation, the new families feel the helping hand of the community from the

very start and are assisted in solving their problems of adjustment in the land of their adoption.

Strangest of all has been the interesting revelation of this system that the immigrants coming into Cincinnati to-day are not the riffraff of a few years back, but are of a really high-grade type that soon make good citizens. The Department of Health has been able to give a clean bill of health to almost all the immigrant families they have examined. The Visiting Housekeepers of the Better Housing League find most of the families intelligent and their homes clean and well kept.

BLEECKER MARQUETTE,
Executive Secretary, Cincinnati Better Housing
League.

Park Departments

An Acre of Park for Each Family

CHICO, CALIF.—A visitor to Chico recently gave the city a new slogan. He called it the "Little City with the Big Park." In many respects Bidwell Park is Chico's most

distinctive feature. This wonder playground comprises 2,300 acres and is the gift to the city of the late Mrs. Annie E. K. Bidwell, wife of the founder of the city.

From records furnished by the Census Bureau at Washington it appears that Bidwell Park is the third largest municipally-owned park in the United States, being exceeded in size only by Fairmount Park, Philadelphia, and Griffith Park, Los Angeles.

A remarkable feature of Bidwell Park is its nearness to the city; in fact, it is a part of the city, having been annexed in 1918. The park proper begins about two blocks from the business district and extends eastward from the city for about nine miles along Big Chico Creek, a stream having its headwaters about forty miles east of Chico in the Sierra Nevadas. The stream flows through the park for the entire year, and the city has complete ownership of water rights, these having been a part of the gift of Mrs. Bidwell.

Words will scarcely do justice to the natural beauties of Bidwell Park. The Bureau of Entomology of the Department of Agriculture is at present engaged in listing the many different kinds of trees growing, for practically the entire tract is wooded.



CHICO'S PARK OFFERS ALL THE DELIGHTS OF THE "OL' SWIMMIN' HOLE"

The monarch of all the trees is Sir Joseph Hooker Oak, which stands in the park about three miles from the city. This mammoth oak is the largest oak tree in the world. It is 101 feet high and is named after the famous English naturalist, who was a guest of General Bidwell during his trip around the world.

The lower portion of the park, for a distance of about four miles, is in the valley. The remainder is in the foot-hills. A feature of the upper part of the park is Iron Canyon, created by Chico Creek, which has worn a deep canyon through solid lava for a distance of several miles. Iron Canyon and Hooker Oak are the Mecca for hundreds of visitors every year, who come to stop at the public camp grounds maintained by the city in one of the groves of the park.

Bidwell Park is under the exclusive jurisdiction of the Bidwell Park and Playground Commission, created by ordinance by the City Trustees. The Commission has full power of expenditure of funds and general supervision over the park.

One of the activities of the Commission is the maintenance of four swimming pools in the creek during the summer season. Temporary dams are placed in the creek, and dressing-rooms are erected of such construction that they may be removed during the winter. Hundreds of children and grown-ups use these swimming places daily, and many come from near-by valley towns for a picnic and a swim in the park during the summer months. All these facilities are free to the public, the Commission having adopted the policy of not permitting any mercenary activities within the park.

Plans and specifications have been prepared by E. J. Symmes, the Alameda architect and designer of Neptune Baths, for a permanent boating lake and large swimming pool in the lower portion of the park, nearest the city. These plans call for an expenditure of about \$50,000 or more, and when they are completed Chico will have one of the finest outdoor amusement places of any interior city in California.

Chico's population by the 1920 census is 9,339. Computing the average family as consisting of five persons, Chico has more than an acre of park space for every family in the city. Can any city in America boast a better record?

C. H. DEUEL,
Member of Park Commission.

Public Works Departments

Permanent and Cheap Safety Zone Markers

PORTLAND, ORE.—The city of Portland has installed the first of its new safety zone markers. These street intersection traffic strips are white concrete blocks, 6 inches square and 2 feet long. The concrete blocks are pre-cast and made of hydraulic cement, sand and gravel. The lower part, or main body, consists of a 1:2:4 mix of ordinary gray cement. The top half-inch is made of "Medusa" or white cement in proportions of one-half cement and one-half sand. The blocks were made for the city by a local manufacturer, and in order to get a glazed and perfectly smooth surface were made face downward. The bottom of the form is a piece of celluloid, slightly curved so that when the block is inverted the top will have a crown of $\frac{1}{8}$ -inch on the 6 inches of its surface. In the bottom of the form the covering, or the white cement and sand, is first placed and then filled up with a body mix. The blocks are left in the forms for two days, taken out and stood on end, cured in steam for 48 hours, then stored in a damp place for three months before use.

In placing these blocks upon the intersections, the pavement has to be cut to a depth of 6 inches, about $\frac{1}{2}$ -inch larger than the block itself. Underneath, and along the sides with the exception of the top inch, is placed a cushion of one-half dry mortar. The blocks are then set, and the upper inch of the space around each block is filled with a product known as Sarco putty. This is a rather expensive asphaltic product, but it serves the purpose admirably, and the small amount used does not create a great expense.

Each summer during the past seven or eight years the city has painted traffic strips in the down-town section, the total of which approximated 15,000 lineal feet. The accumulated cost of this painting and repainting each summer has amounted to date to about \$2 per lineal foot, and the painting has to be done each summer, as it is worn away by traffic and washed away by the street flushers. The concrete block will probably outlast the pavement itself. Each block



PORTLAND'S NEW MARKERS ARE DISTINCT, PERMANENT AND ECONOMICAL

costs \$1. The entire intersection is counted as 288 lineal feet. The total cost of block, cutting pavement, setting, truck-work and material is \$4.17 per block, and as there are 56 blocks at this intersection, the total cost of marking the intersection is \$233.52. This gives a cost of about \$.82 per lineal foot, in comparison with the \$2 accumulated cost of painting over a four- or five-year period.

There are one or two small items which it might be well to note in the setting of these blocks. The first one is that in stretching the chalk line it should be done in such a manner that an exact or true line will result, as any deviation of these glaring white blocks in a black pavement shows quite plainly. Also, after the joints are filled with the hot putty, an ordinary soldering iron may be run around the edge to completely seal it to the black pavement.

The following is quoted from the report of the Chief of the Bureau of Maintenance on the traffic strips at West Park and Clay Streets:

"In watching the traffic at this intersection, I am quite confident that a better solution is arrived at in this construction than with the painted strips, as there is no rocking of the blocks nor any movement whatever that can be noticed under the heaviest trucks that pass. There is nothing that can hurt them nor in any way destroy them, as they are three months curing, partly in steam, and exceptionally hard. Street flushing will only serve to keep them clean and keep the white surface always in view of passing pedestrians. From the prior painting jobs that this department has done for the Police Traffic Bureau, it has been

learned that there is a total of approximately 15,000 linear feet of traffic strips to be painted. Each year this has been done, and each fall the strips disappear from the streets.

"I am of the opinion that should this construction be substituted in this city for painting, and should the Council decide that they wished permanent traffic strips throughout the down-town section, the concrete blocks are the best solution."

R. G. McMULLEN,
Chief, Bureau of Maintenance, Department of
Public Works.

Highway Departments

Municipality Takes Over Street Cleaning

PHILADELPHIA, PA.—For many years prior to 1921 Philadelphia entrusted its important street cleaning functions entirely to private contractors. From 1869 street cleaning by contract was made obligatory by an act of the Legislature, and from this obligation the city was not released until 1919, when the Legislature granted the city a new charter. The new charter went into effect January 5, 1920, but the street cleaning provisions of it were not made operative until January 1, 1921. This period of a year was necessary because contracts had been let for 1920 prior to the new charter. The delay provided time to prepare for the new order of things.

This year municipal forces are cleaning

the streets in the central district, which is the most frequented of the city, to the general satisfaction of the public. The remaining districts are still cleaned by contract. The city has also purchased and is operating the garbage reduction plant formerly owned by a private company which has held a monopoly on garbage reduction for several years. The existing street cleaning contracts expire on December 31, 1921, but are terminable on September 30 at the option of the city, if three months' prior notice is given. The complete abolition of street cleaning contracts, whether on October 1 or December 31, depends primarily on the providing of funds for the purchasing of plant and equipment, but it is anticipated that a full municipal program will be put into effect by January 1, 1922

JAMES W. FOLLIN,
Chief Engineer, Bureau of Municipal Research.

Health Departments

Community Public Health Meetings Increase Public Interest

BOSTON, MASS.—During February and March there were held in nine community centers in Boston public meetings with special programs arranged for the purpose by the Service Unit organization under the joint auspices of the City Health Department and the Department for Extended Use of Public Schools. The series of meetings had for its slogan "Your Good Health and Mine." In each program were motion pictures relating mainly to health subjects, singing by the audience of songs in the spirit of the occasion, with song leader and pianist, constructive information on the screen by means of "silent talks," always a patriotic feature to enable the programs to contribute to good citizenship, and a ten-minute talk by a representative of the Health Department on the subject of co-operation in preventing common contagious diseases.

A feature of each of the series of meetings was a brief period in which men and women in the audiences were encouraged to ask questions for the health man to answer. This proved an exceptionally good opportunity for the Department representa-

tive to sense the sentiment of the community, and an equally good chance for the people present, to "say to his face" some of the things they might have been thinking about for a long time.

The motion pictures used in these neighborhood health meetings have related to such subjects as disposal of sewage in cities, forms of bacteria, care of the teeth, personal hygiene, swimming, life saving, first aid, etc. Each program has also included films of general instructive character, not entertainment so much as enjoyable films of constructive value.

The information and suggestions given by means of the "silent talk" on the screen included a number of familiar "Health-grams" such as:

These things remember,
If you are wise:
Fresh air,
Good habits,
And exercise.
Foods should be fresh
and pure and clean;
Be on your guard
for dirt unseen.

And even more specific health tips were in order.

The attendance and interest of the men and women clearly indicated that the meetings were well worth while. Where the character of the audience made it advisable, the speakers delivered their addresses in Yiddish or Italian.

The meeting in the West End had a particular local value because here the Health Department, in coöperation with the Red Cross, District Nursing Association, and several other similar organizations, has established the No. 1 neighborhood "Health Unit" for Boston, at No. 17 Blossom Street. This Unit has become a neighborhood institution of recognized importance to the welfare of that section of the city.

One outcome of the coöperation which resulted in these neighborhood meetings is that Health Commissioner Woodward and Mr. Mulroy, director of the school centers, have worked out a plan which is intended to make each school center building a permanent local health center, at which the district officers of the Health Department may have headquarters and meet people of their districts at stated intervals.

PETER F. KELLEY,
Director of Health Education Service of the
Health Department.

Selecting the Internal-Combustion Engine for the Municipal Power-Plant*

By W. F. Schaphorst, M. E.

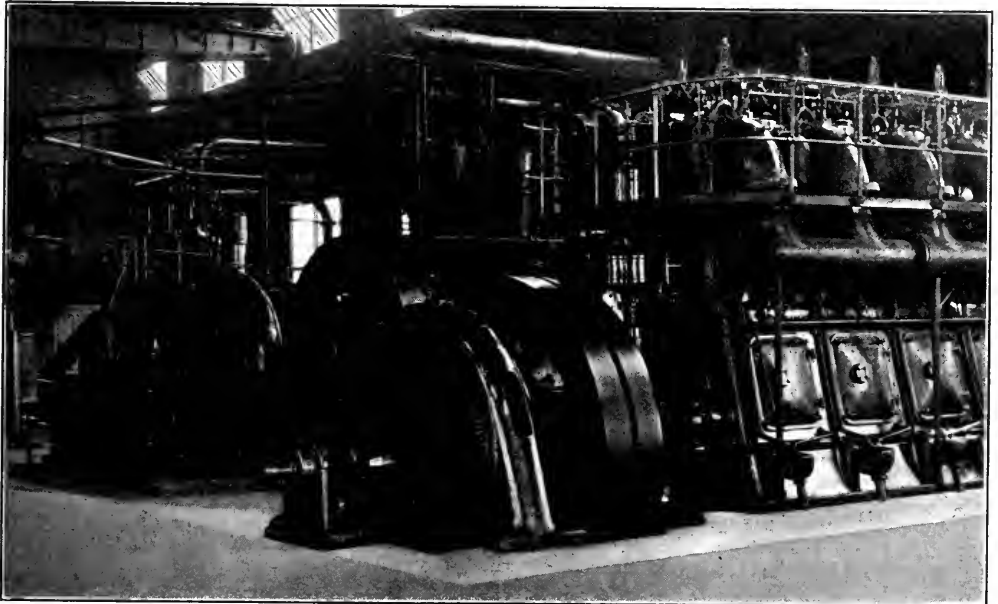
THE internal-combustion engine, according to actual brake tests, is the most efficient of all heat engines. Efficiencies as high as 33 per cent are not uncommon. Yet we find that engines of this type are not so popular in municipal power-plants as the less efficient prime movers—steam engines and steam turbines. True, the Diesel type of engine is being used in municipal plants and it is making rapid and encouraging headway. Why, though, is it not being adopted more rapidly?

The answer is, the first cost has been considered too high. The Diesel engine was used in Europe long before it came to the United States. American engineers knew of the existence of the Diesel engine and knew of its high efficiency, yet they did not specify it, because fuel was so cheap here that its use would not have been economical. It is not always economical to use the most efficient engine. Where coal is cheap and fuel oil is expensive, the most efficient Diesel en-

gine cannot compete with the much less efficient simple steam engine. The cost of the engine, the cost of fuel, length of life, upkeep cost, operating cost, cost of housing, taxes, insurance, interest on the investment, scrap value of equipment where replacements are made, rent, etc.—all these points must be given proper consideration before deciding on any important new apparatus or improvements.

The reason for the efficiency of the internal-combustion engine is that the fuel and air are fed directly into the cylinder of the engine itself, and compression, ignition, combustion, expansion, and exhaust all take place within the cylinder. The opportunities for loss are thereby reduced to the very minimum. The steam engine is less efficient because combustion takes place under a boiler and a very large percentage of the heat is wasted up the chimney and is radiated through the boiler setting; some fuel goes to waste with the ash; the steam is passed through pipes which radiate more

* Copyright, 1921, by W. F. Schaphorst.



INTERIOR OF POWER-PLANT AT BRYAN, OHIO, SHOWING A 520-HORSE-POWER BUSCH-SULZER-DIESEL ENGINE AT THE RIGHT, AND TWO 225-HORSE-POWER ENGINES OF THE SAME TYPE AT THE LEFT

heat into the atmosphere; there is a friction loss in the piping, and, lastly, a cylinder condensation loss in the steam engine cylinder. In the internal-combustion engine many of these losses are eliminated and the others are confined within the walls of the cylinder. Some heat, of course, is lost through the walls of the cylinder, but in certain types of modern internal-combustion engines a large percentage of this heat is recovered by generating steam within the cylinder jacket and using the steam for driving a steam engine. The rest of the heat is lost through the exhaust, but this heat also is often utilized for the generation of steam.

For municipal power-plant service the Diesel engine easily predominates. It is an excellent engine and certainly has not yet been appraised at its real worth. It was first introduced into this country by Adolphus Busch of St. Louis, in 1898.

Disadvantages and Advantages of Diesel Engines

A great many engineers—not to mention those who are not engineers—believe that the Diesel engine is not reliable; that it is too complicated to give durable, economical, and all-around, year-after-year satisfactory service. This, however, is far from the truth in view of the statement by one authority that out of the total of 370,000 horsepower manufactured to date, over 98 per cent is still in actual service. This means that only 2 per cent has been discarded. Of this 2 per cent, however, one-third was demolished by fire, so there remains only $1\frac{1}{3}$ per cent as having been discarded. The reasons for discarding are not given. In view of these facts, then, and in view of the fact that present users are sending in repeat orders, it must be admitted that the Diesel engine has merit—that it is worthy of serious consideration.

To be sure, the Diesel engine is not ideal from every angle. It has a number of general faults. The foremost arguments advanced against its use are these:

1. *Cost.*—The initial cost of the Diesel engine is high.
2. *Starting.*—It is sometimes difficult to start.
3. *Complexity.*—Its starting mechanism is liable to be complex.
4. *Quality of oil.*—Changing the quality of fuel oil is liable to influence the certainty of operation of the engine.
5. *Altitude.*—The Diesel engine, like all

internal-combustion engines, is affected by changes in altitude.

6. *The piston.*—It is sometimes difficult to cool and oil the piston; as a result, the piston is liable to be short-lived—from three to six years.
7. *Single-acting.*—It is difficult to make a Diesel engine double-acting, on account of packing and heating troubles.
8. *Heavy.*—Reciprocating parts are heavy.
9. *Foundations.*—Massive foundations are required.
10. *Governing.*—Trouble is sometimes experienced with governors and regulation.
11. *Fly-wheels.*—Heavy fly-wheels are necessary.
12. *Noise.*—Some Diesel engines are noisy.
13. *Lubricant.*—High-grade oil is needed for lubrication.

The above disadvantages of the Diesel engine may loom up large, but there are, on the other hand, the following advantages to outweigh them:

1. No costly fuel supply apparatus. Fuel oil is more easily used than coal and can be handled mechanically with a pump, and the cheaper grades can be used.
2. No fireman. Less labor is required to operate a Diesel engine than to operate a steam power-plant of the same capacity.
3. No boiler feed pump.
4. No water purification plant.
5. No steam piping.
6. No condensers with their auxiliaries.
7. No smoke.
8. Smaller power-house with less floor space.
9. No steam boilers with attendant up-keep, etc.
10. No chimney.
11. Not necessary to bank fires.
12. Automatic and close regulation of fuel as well as power.
13. Continuously high efficiency.
14. The process of combustion takes place in the Diesel engine under almost ideal conditions.
15. No engineers' licenses.
16. No preliminary heating-up.
17. No ashes, dirt and dust.
18. No stand-by losses.
19. No overheated buildings.
20. Larger quantities of reserve fuel easily stored.
21. No depreciation on stored fuel.
22. No losses on fuel in transit.
23. Power available immediately. The Diesel engine can be started in less than three minutes, and full load can be pulled from the very start.
24. Highest thermal efficiency known.
25. Practically same economy at half-load as at full load.
26. The operating cost of the comparatively small Diesel-driven power-plants is frequently equal to or even better than the operating cost of large steam-driven

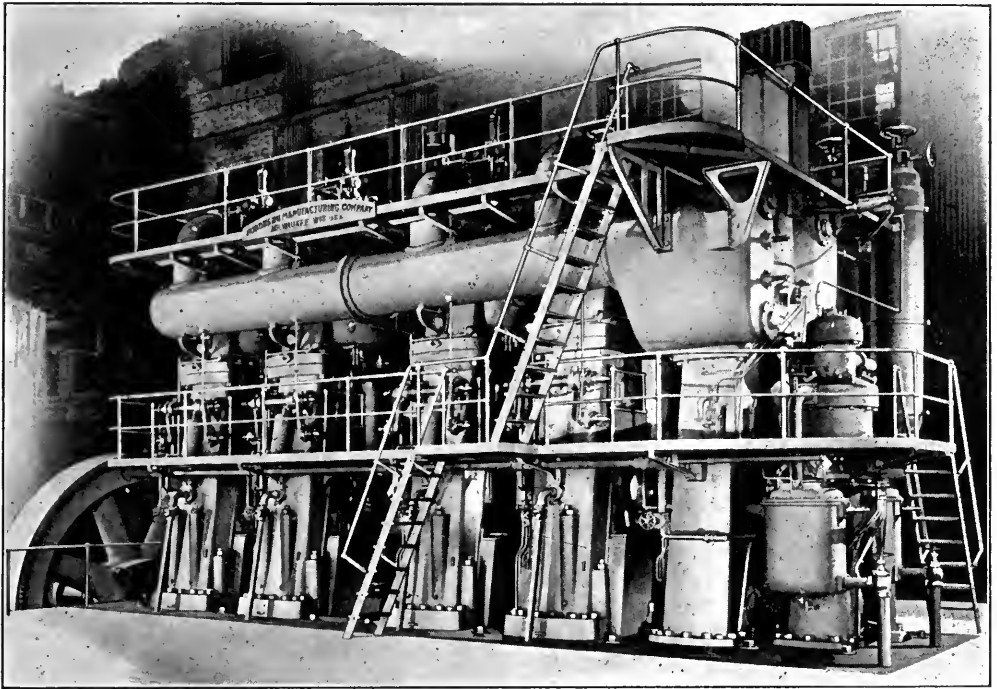
central power-plants.

27. It costs less to move a Diesel engine from one locality to another than to move an entire steam power-plant of the same capacity. This is because the Diesel engine is practically a "self-contained power-plant."
28. Engine repair costs are no higher than with steam plants.
29. It has been proved that much of the heat now wasted from the Diesel engine can be utilized—about 12½ per cent from the heating jacket and 15 per cent from the exhaust, and this total of 27½ per cent is 27½ per cent of the "initial heat value of the fuel."

plants of equal or better efficiency cannot be built at the same low cost. In fact, too often it is the case that "first cost" determines the kind of purchase, rather than the ultimate economy.

Location Influences Economy of Diesel Installation

Whether or not a Diesel engine is suitable for your municipal power-plant depends largely upon the location of your city. What is the cost of fuel oil in your locality? Is oil cheap and coal dear? Or is the re-



A NORDBERG 2,000-HORSE-POWER DIESEL ENGINE DIRECT-CONNECTED TO A 1,350-KW., ALTERNATING-CURRENT GENERATOR

The two-stroke cycle Diesel engine, which is making rapid headway, has these additional advantages:

1. Accessibility.
2. Still smaller space.
3. Provided with cross-head, allowing large clearance of the piston in the cylinder.
4. Exceptional rigidity and smaller weight.
5. Does not require closely fitted bearings to prevent knocking, the pressure being always in one direction.

In general, the sizes of Diesel engines that are most popular in municipal power-plants are smaller than 2,000-kw. This is due to the fact that small steam power-

verse the case? In general, the use of the Diesel engine is discouraged in Eastern Seaboard States on account of the high cost of oil and the cheaper coal. Nevertheless, many engines of this type are in profitable operation in the Eastern region. The Middle-Western and the Southwestern States are logical Diesel engine states, because of the relative prices of oil and coal. More than half of the total Diesel horse-power of the United States—in fact, nearly 70 per cent—is installed in seven Central and Southwestern States—Arizona, New Mexico, Texas, Oklahoma, Kansas, Missouri,

and Louisiana.

Useful for Peak Loads

It does not pay to operate a large steam power-plant on a small load. Consequently, it sometimes pays to install an oil engine to handle the load during the "off peak" periods, in the meantime banking the fires under the boilers of the steam plant.

Again, steam power-plants are sometimes unable to take care of peak loads which come on suddenly, as during a rain-storm, or at night when extra illumination is wanted suddenly, or once a year during an unusual occurrence in the city. A gasoline or oil-engine-driven unit can very nicely take care of such a peak load. It is better to invest in a relatively inexpensive unit of this kind for intermittent work than to spend considerably more for a much larger steam plant that would operate at such peak loads during a total of only a few hours per year. Sometimes, also, it is impossible or very costly to find space enough in which to place new boilers and engines. For example, in one instance a small 80-horse-power semi-Diesel oil engine is belted to a generator for handling peak loads. The floor space occupied is only 15 by 30 feet. The cost of operating this oil engine, including water, oil, etc., averages only \$9.49 a day.

Combined Plants

Sometimes combined steam power-plants and Diesel-driven units are to be recommended. For example, where good use can be made of all exhaust steam from a steam power-plant, the Diesel engine cannot compete. In other words, the Diesel engine is not profitable where large amounts of exhaust steam can be profitably used. But where there is a large enough surplus of exhaust steam which must be allowed to go to waste, it is better to install Diesel engines of such power that no exhaust steam will be wasted.

First Municipal Installation

The first municipal water and light plant in the world to install Diesel oil engines is in Menasha, Wis. In this plant four engines were installed in 1905, 1911 and 1913, totaling 600 horse-power. One thousand gallons of water are pumped against 49.5 pounds pressure with 0.05 gallons of fuel oil. The cost of fuel per kilowatt hour

is only 4 to 6 mills. The total cost of pumping 146,000,000 gallons, including the operation of the water and city-lighting plant, distribution, office and depreciation, amounted to only \$4,121.25 for one year.

In another municipal plant the first Diesel engine was installed in 1905. No additional steam equipment has been purchased since then. One of the officials writes:

" . . . it [the plant] was built in 1892. It represents an investment of about \$200,000, of which all but \$22,500 has been from profits, since commercial lighting and power were added to the original street lighting plant in 1898, and at the present rate the entire debt will be wiped out within a year. Our rates have always been the lowest in the state, and nearly all the factories of this city are operated by the power of this plant—about 1,200 horse-power in motors—not to mention a heavy lighting load."

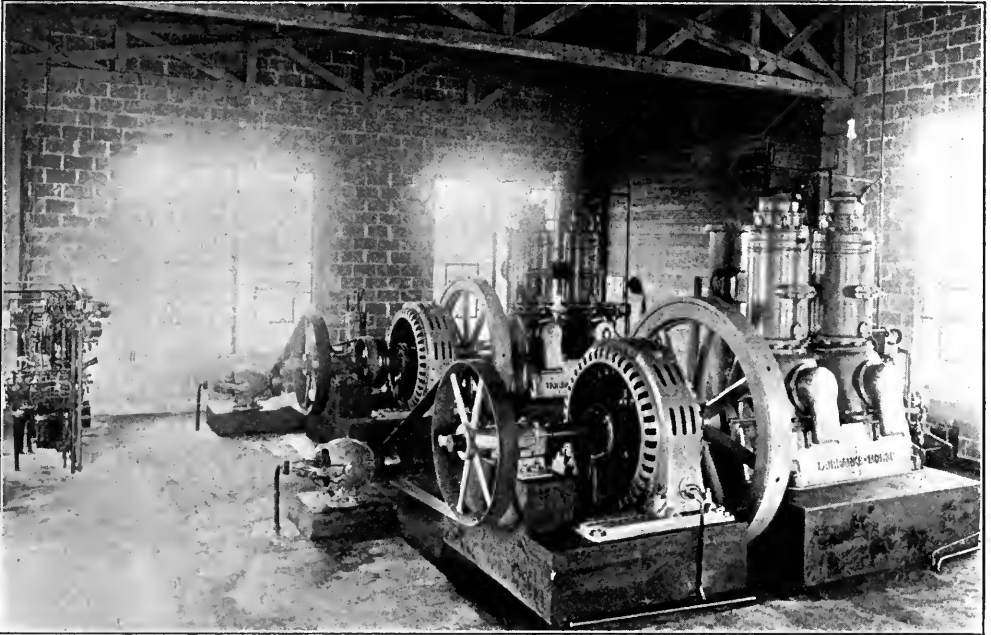
Another municipality reports the cost of only 8 mills per kw. hour on the switchboard with the use of Diesel engines. The water-works pumps are motor-driven in duplicate. This plant sells enough commercial service so that street lighting and water service is free to the city.

Use in Small Towns

Even in small towns having a population of less than 2,000, it has been proved profitable to install Diesel engines. For example, Kiowa, Kans., according to the last census has a population of less than 2,500. In 1908 the town installed a steam power-plant consisting of two 16 by 6 feet horizontal, return-tubular boilers and a simple high-speed steam engine directly connected to a 75-kv.-amp. generator. Later another simple high-speed engine directly connected to a 100 kv.-amp. generator was added. In 1914 this steam power-plant was replaced by a Diesel engine. The Diesel engine has been operating steadily ever since, one of the steam units having been retained in case of shut-down of the Diesel engine. Upon making this change, the fuel cost was reduced from 5 cents per kw. hour to only 3 mills per kw. hour, or almost 95 per cent.

Fuel Oil

There is to-day an enormous demand for gasoline, most of which is derived by distillation from crude oil. This distillation leaves a residue much greater in volume and weight than the gasoline taken from it. The residue, which is a fuel oil, is an excellent product for use in the Diesel type of engine.



TWO 100-HORSE-POWER, DIRECT-CONNECTED FAIRBANKS-MORSE OIL ENGINES DRIVING TWO GENERATORS IN PARALLEL, WHICH IN TURN DRIVE TWO 6-INCH, 500-GALLON FIRE PUMPS

The increasing popularity of the motor vehicle for social and business purposes promises a still greater supply of this kind of fuel.

We have all of us frequently heard and read the claim that oil is becoming scarce—that our sources of supply are on the verge of exhaustion. Oil authorities assure us, however, that for many years there will be no danger whatever of depletion. Many sources of oil fuel supply in the United States have not yet been touched. Tremendous quantities of oil will be shipped in from virgin fields in Canada, Mexico, the West Indies, and South America.

Shale oil has been used for a number of years for Diesel engines. It is stated by one authority that the opening up of vast deposits of oil-bearing shale will yield a supply of fuel oil as great as that of all fuel oil brought to the surface to date. Tar oil is a by-product in the manufacture of artificial gas and has been used successfully abroad. It is another source of supply of fuel.

It is quite probable that oil prices will advance as years roll on, but so will the price of coal. The Diesel engine will always be an active and worthy competitor of all steam prime movers.

Other Internal Combustion Engines

Gasoline and kerosene engines have made practically no progress in the municipal power-plant field. Occasionally such an engine is used for pumping water or for sudden peak-load service. The high cost of the fuel, however, together with trouble from hot bulbs, electric ignition systems, distributing shafts, cams, valves, etc., usually causes the purchaser to turn to something less troublesome and less expensive to operate. Although in some types these faults have been largely and perhaps entirely overcome, it is well to bear the objectionable features in mind when purchasing.

A type of plant that is commonly frowned upon now is the producer gas plant. Even well-informed engineers advance the opinion that the gas producer plant has passed its peak. As was the case with the Diesel engine producer, gas units are now "successful" in Europe, whereas in this country they generally are not so successful. In Europe plants as small as 10 horse-power are commonly found. Gas producer units can operate on very cheap fuel—peat, lignite, low-grade bituminous and anthracite coals, wood, charcoal, oil-shale rock, tanbark, etc. Almost anything that contains

combustible matter or that will burn can be utilized in a producer. The producer should therefore be ideal in the Northwestern and Southwestern States, where there is an ample supply of cheap lignite.

One writer gives the following as reasons why producer gas plants are not more commonly used in the United States:

1. American manufacturers have copied foreign types not suitable for American fuel; consequently, there have been many failures. They have not displayed sufficient initiative to apply the producer to our own fuels.
2. They have been regarded as "too much trouble." Sufficient patience has not been displayed.
3. Attempts have been made to produce clean gas without using gas washers or tar extractors.

Producer gas plants have apparently passed through the experimental stage and are now making some headway in municipal power-plants. For example, the city of Allentown N. J., recently installed a gas producer plant, which, according to the Mayor of that city, A. Robinson, is working perfectly. They are very economical when they operate satisfactorily, but they have not made progress equal to that of

the Diesel or semi-Diesel engine, principally because they require greater skill to operate. Improvements are constantly being made, however, and it is quite possible that perfectly satisfactory producer gas plants will soon be more common than at present. It is reported that at the present time about 300 plants of this type are in operation in this country.

In small municipal installations where steam power is used, it is not at all uncommon to find a coal consumption of 10 pounds per horse-power hour, equivalent to 130,000 B. t. u. Compared with this, one manufacturer of a producer gas plant claims only 10,000 B. t. u. per horse-power hour at full load. This manufacturer goes further in that he recovers heat from the producer and uses it for heating buildings and for furnishing hot water. He claims that with coal costing \$15 per ton he can furnish 100 brake horse-power for 75 cents per hour; with coal at \$10 per ton, 50 cents per hour; and with coal at \$5 per ton, 25 cents per hour. A power-plant device that will make one pound of coal produce as much power as can be produced from two pounds by other means is surely worthy of attention and mature thought.

The Cost of Repairing Bituminous Pavements

THE first sheet asphalt pavement in Albany, N. Y., was laid in 1889, and since that time there has been laid over 336,000 square yards, of which about 190,000 square yards, or more than one-half, has been laid since 1914. There was no asphaltic concrete pavement laid in the city previous to 1914, but since that time about 38,000 square yards has been laid. The city has laid no bitulithic pavement, but there is about 24,000 square yards within the city limits, laid by the State Highway Commission. Thus there is about 400,000 square yards of bituminous pavement in Albany, and the tendency is to use more asphalt from year to year in paving residential and light traffic streets where the grades will permit.

With this large yardage, equivalent to about 22½ square miles of pavement 30 feet wide, repairs are necessary, and as the pavements become older, more and more repairs are necessary to properly maintain

them. The Department of Public Works has had the asphalt repair work done by contract because the city has no facilities for doing the work itself. The prices per square yard for repairing the asphalt pavements have been increasing year by year, as follows:

1915.....	\$1.23½
1916.....	1.63
1917.....	2.10
1918.....	2.10
1919.....	2.20
1920.....	2.60

Considering the cost and difficulty of securing labor and materials in the last few years, these prices have not been unreasonable. The price per square yard includes cutting out and removing the old asphalt, cleaning the space to be repaired or renewed, and furnishing and placing the new binder and the new asphalt wearing surface. If any part of the concrete foundation has to be renewed, this is paid for at a fixed price per cubic yard.

Establishing Rates for Service Rendered by Public Utilities by Contract—Part II

A Discussion of the Legal Status of Contracts Between Utilities and Cities, of Municipal Ordinances and State Public Utility Commission Decisions

By **Walter A. Shaw**
Consulting Engineer, Chicago, Ill.

IN one of the recent cases decided by the Illinois Supreme Court on October 23, 1920, *Maclay Hoyne v. The Chicago and Oak Park Elevated Railroad Company*, 294 Ill., 413, in which the right of the elevated railroad company to increase its passenger fares from 5 cents to 6 cents for each passenger was challenged, the Court said:

"The Supreme Court of the United States, in *Home Telephone Company v. Los Angeles*, 211 U. S., 263, has stated it as the settled doctrine of that court that the state may authorize one of its municipal corporations to establish, by an inviolable contract, the rates to be charged by a public service corporation or natural person for a definite term not grossly unreasonable in point of time, and that the effect of such a contract is to suspend, during the life of the contract, the governmental power of fixing and regulating the rates. It is further stated, however, in that case, that for the very reason that such a contract has the effect of extinguishing pro tanto an undoubted power of government, both its exercise and the power to make it must clearly and unmistakably appear, and all doubts must be resolved in favor of the continuance of the power. It is the settled doctrine of Illinois that neither the state nor our constitution has given cities and villages, or any other municipality in this state, the right or power to establish by such a contract the rates to be charged by railroad companies, whether street railways or railroads organized under the general Railroad Act."

The Court further said:

"The result of our holding being that neither the constitution of this state nor the Legislature in any act has given to the city of Chicago or to any other city of this state the authority to make an inviolable contract with any street railway or any railroad company with reference to the rates of fare which such companies shall charge passengers, it follows that the city of Chicago's contract with appellees with reference to fares to be charged by them is not binding on the state. As against the state's right to fix the rates of fare for appellees through the Commission, such contract has no binding force. (*Detroit v. Detroit Citizen's Railway Co.*, 184 U. S., 368.) To hold otherwise would be, in effect, to oust the state of one of its sovereign prerogatives. Section 23 of Article 4 of our constitution, providing that

the General Assembly shall have no power to relieve or extinguish, in whole or in part, the indebtedness, liability or obligation of any corporation or individual to this state or to any municipal corporation therein, is no bar to the Legislature asserting its right to regulate and fix rates for railroad companies. Giving the words 'liability and obligation,' used in that section, their broadest meaning, the provision would then not have the effect to make valid and binding, as against the state, the rates of fare established by the city of Chicago and appellees in their contracts. The liability or obligation spoken of in that section of the constitution only has reference to liabilities and obligations which the corporation and the municipality have the legal right and power to make, not only as between themselves but also as against the right of the state to interfere. We cannot interpret this provision of the constitution to give cities the right, by contract, to establish rates for railroad companies when the same constitution in other sections has vested this right solely in the Legislature. For the same reason it is equally clear that the provisions of the state and Federal constitutions providing against the passage of laws by the state impairing the obligation of contracts are not applicable to the contracts in question."

In the case of *The Chicago Railways Company v. The City of Chicago* (292 Ill., 190), in which the city of Chicago was urging that the settlement ordinances passed in 1907 constituted valid contracts with the street car companies as to rates of fare, our Supreme Court said:

"A question argued at length is whether the General Assembly, acting through the State Public Utilities Commission as its authorized agency, may lawfully change the rate of fare fixed by contract between a municipality and a public utility, such as a street railway corporation. That question was recently given full consideration upon the same authorities here cited and relied upon, in the case of *Public Utilities Commission v. City of Quincy*, 290 Ill., 360, and it was there held that the General Assembly has such power. It was there determined that the power to regulate rates to be charged by a public utility is vested in the General Assembly; that the General Assembly has never conferred upon any municipality power to make inviolable contracts for rates for a public utility; that such power of a mu-

nicipality is not to be implied from authority granted to control streets and regulate the use thereof by public utilities."

The fact is, that Illinois was the pioneer in establishing the law as to the power of the state to regulate rates. In the celebrated case *Mann v. People*, 69 Ill., 80, and affirmed by the United States Court, 94 U. S., 113, it was held that the power to fix and regulate rates as to public utilities was a common law, one inherent in the state.

From a legal standpoint there never was a proposition of law more definitely settled as to the rights of the state through its police power to fix and determine just and reasonable rates, or the duty of the members of the Public Utilities Commission under their oath of office.

Thus far I have dealt only with the legal phase of the problem. There are other phases which may be discussed with profit.

Referring to resolutions adopted by the City Council of Quincy, Ill., the following facts are at least interesting:

On May 19, 1914, the Quincy Gas, Electric and Heating Company made formal application to the Public Utilities Commission of Illinois for authority to change its rates for gas service in the city of Quincy, Ill. On July 7, 1914, the city of Quincy (afterwards designated the petitioner in the proceeding) filed with the Commission a cross-petition and complaint, among other things alleging "that the present rates for gas and electricity and the proposed rates for gas in the said city of Quincy are unjust, unreasonable, discriminatory, and preferential; and praying that the Commission will make the necessary and proper investigation to determine what shall constitute just, reasonable, non-discriminatory, and non-preferential rates * * * and enter an order fixing such just, reasonable, non-discriminatory and non-preferential rates, and requiring the observation thereof."

On July 14, 1914, the company filed its answer to the cross-petition and complaint, stating among other things: "But it is denied that the rates for gas and electricity in effect in the said city of Quincy are in excess of the just and reasonable rates; that the schedule of rates now in effect is discriminatory and preferential."

On March 1, 1916, the company filed a further reply to the cross-petition and complaint filed by the city of Quincy, alleging among other things that:

"On April 5, 1911, the city of Quincy enacted an ordinance granting to the Quincy Gas, Electric and Heating Company, respondent herein, permission to construct, maintain, and operate an electric light, power, and heating system in the city of Quincy, for a period of thirty years, and providing a schedule of rates to be charged for such service and the manner in which such rates, from time to time, might be changed, * * * (9) that in keeping and performing the various covenants and agreements contained in the said ordinance agreement, the respondent has relied upon the said ordinance agreement constituting a valid, binding, and legal contract between the said city of Quincy and the respondent, and that the said city of Quincy has received and accepted the benefits arising from the said performance and the expenditures of the said large sums of money, (10) that the respondent has at no time consented that the rates charged by it for electric current furnished said city of Quincy and its inhabitants shall be reduced below the schedule of rates filed with this Commission on February 10, 1914, (11) that the rates charged by the Quincy Gas, Electric and Heating Company for electricity are not excessive rates, under the said ordinance agreement, (12) that, in view of the terms and conditions of said ordinance agreement, this Commission has no jurisdiction to investigate and determine the rates to be charged by respondent, and that only a court of law or equity has such jurisdiction, * * * (16) and that, until the said ordinance agreement is amended as aforesaid and the respondent is reimbursed by the said city of Quincy as aforesaid, this Commission has no jurisdiction to investigate and determine the rates of charge to be made by respondent for electricity furnished the said city of Quincy and its inhabitants, nor has the Commission authority to compel respondent to reduce the rates provided for in the said ordinance agreement unless consented to by the respondent, and that the said act entitled 'An act to provide for the regulation of public utilities' is, as to respondent, unjust, unreasonable, confiscatory, void, and in violation of Section 1 of the Fourteenth Amendment and Section 10 of Article 1 of the Constitution of the United States." (I. P. U. C., V. 4, pp. 424, 424, 425 and 426.)

It Is a Poor Rule That Does Not Work Both Ways

Thus, in 1916, the city of Quincy was calling upon the Commission to fix and establish lower rates than those provided by a franchise ordinance. In defense the company urged that the ordinance constituted a contract, and for that reason the Commission did not have jurisdiction and that a variation from said ordinance rates would violate the Constitution of the United States. When the scene is shifted to 1919 and 1920, by reason of economic conditions brought on by the Great War, and it becomes neces-

sary for the Commission to raise rates, in many instances exceeding rates fixed by ordinances, the city of Quincy shifts its position and claims the rates to be charged are those fixed by so-called contract ordinances and that any annulment of them would violate the Constitution of the United States. On the other hand, you are not now hearing the utility companies complaining of the action of the Commission in fixing rates exceeding ordinance rates.

It is unnecessary to argue that if the Commission has power to fix rates lower than those set forth in a so-called contract ordinance, if found to be excessive after investigation, the Commission likewise has power to fix rates higher.

The Commission in disposing of the cross-petition and complaint issued an order on May 7, 1917, Case 2523, I. P. U. C., V. 4, p. 423, ordering the company to place in effect rates substantially lower than those permitted by the city of Quincy, and the company obeyed the order. In order to take such action, necessarily the Commission was required to hold that rates found just and reasonable by it must prevail irrespective of those set forth in so-called franchise or contract ordinances.

The Illinois Commission early in its existence clearly declared itself as to its duty and power to fix and establish just and reasonable rates, contract ordinances to the contrary notwithstanding.

In the case of Cook County Real Estate Board v. Chicago Surface Lines et al., case 3281, I. P. U. C., Vol. 2, p. 291, passed September 29, 1915, the Commission held that:

"The Commission was given full jurisdiction in the Illinois Public Utilities Law over all questions involving the service of public utilities. In the exercise of its powers under the law, the Commission from all the evidence in the case believes that trailers should be operated by respondents, and the order will so provide."

This order was confirmed by the Illinois Supreme Court, which was sustained by the United States Court. (*City of Chicago et al., v. Wm. L. O'Connell*, 278 Ill., 591.) This order of the Commission, heretofore referred to, directing the operation of trailers, was in direct conflict with the settlement ordinances of 1907.

In the case of Polo Mutual Telephone Company and the intervening petition of the city of Polo, Illinois, No. 3121, I. P. U. C.,

Vol. 3, p. 31, decided December 23, 1915, Commissioner Yates speaking for the Commission, after quoting many court decisions, held that:

"In the present case it clearly appears that the legislative department of this state has never divested itself of the power to regulate rates of telephone companies, and our conclusion is that this Commission is not bound by the so-called contract entered into between the city of Polo and the Polo Mutual Telephone Company, in so far as said contract attempts to establish the rates that shall be charged by said telephone company."

In raising rates during the last few years, the Commission first applied the universal rule laid down by courts—"The utility is entitled to a fair return upon the fair value of the property," and the findings established early in its existence as to its jurisdiction versus so-called contract ordinances so clearly settled by the courts.

The Purpose of State Commissions

Regulation came about by reason of insistent demands by the public to correct abuses by so-called monopolies engaged in the utilities field, upon which the public was dependent without having effective instrumentality for protection. The keynote of all regulatory laws is that the public shall receive adequate services at just and reasonable rates. The fact is that state commissions were created for the very purpose of breaking so-called contract ordinances. In the pre-war period the public believed that many of the rates authorized by ordinances were excessive, and necessarily if the State Commission was to give any relief, the rates prescribed by ordinances or otherwise must be disregarded. That part of the public which now accuses the Commission of being contract-breakers and corporation tools by reason of disregarding those so-called contracts, is responsible for obtaining decisions from various state courts and even the United States courts, as hereinbefore referred to, that the rates prescribed in these ordinances must be set aside when it is determined, as provided by law, that the rates so fixed are unjust, unreasonable, insufficient, or excessive. From the point of view of that same part of the public, in the pre-war period the test applied to determine the popularity of the Commission was the extent to which it lowered rates and broke so-called contracts.

Apparently there is a movement on foot

to change the laws of Illinois to the effect that any rates or charges for utility service fixed by so-called contract ordinances shall prevail and remain unchanged during the life of the ordinance. This means that the public would be bound without recourse to pay the rates for the term of the ordinance, which may be based upon present high prices of labor and material. Suppose a franchise expires now and the utility demands a new ordinance very favorable to itself and greatly to the disadvantage of the public, under the threat of discontinuance of service. Is it not possible under such conditions to have a great wrong forced upon the public without recourse? It will be remembered that the street car franchise recently expired in Toledo, Ohio, and the company, in order to compel the city to comply with its demands, removed all its street cars from the city during the night.

The Supreme Court of this state in the Danville case above, back in 1899 when times were normal, said:

"It is impossible to determine with absolute or even tolerable certainty what changes a few years might work in the character and

reasonableness of rates to be charged for water-supply. No contract is reasonable by which the governing authority abdicates any of its legislative powers and precludes itself from meeting, in a proper way, emergencies or occasions that may arise."

The Court of Appeals of New York in passing upon the constitutionality of the New York emergency housing law said (reported in *Chicago Tribune*, March 9, 1921):

"Either the rights of property and contract must, when necessary, yield to the public convenience and the public advantage, or it must be found that the state has surrendered one of the attributes of sovereignty for which governments are founded, and made itself powerless to secure to its citizens the blessings of freedom and to promote the general welfare."

Shall the state surrender one of the attributes of sovereignty for which governments are founded, and make itself powerless to secure to its citizens the blessings of freedom by reason of present agitation, largely political, growing out of economic conditions as a result of the great World War? There can be but one answer. No.

ACKNOWLEDGMENT.—From a paper read before the Iowa and Illinois Section of the American Water Works Association.

Granite Block Paving on Macadam Base

Experiment in Relaying Pavement is Successful in Providence, R. I.

When the Department of Public Works of Providence, R. I., had to relay a considerable yardage of old granite block pavement last year, the engineers decided to use an asphalt macadam base under the blocks. The old granite block pavement was originally laid partly on a 6-inch cement-concrete foundation and partly on a rolled broken stone base. Much of the pavement had settled in places after undergoing considerable traffic.

The first step was to take up and clean the old blocks thoroughly, no recutting being necessary. The subbase was of gravel, varying in thickness up to 8½ inches. This subbase was rolled thoroughly, and on top of it was placed 2-inch trap rock, which was rolled to an average depth of 3 inches. Smaller sized trap rock was spread and rolled to fill the larger voids.

This stone was then given a penetration treatment of No. 96 Texaco asphalt, using

about 1½ to 1¾ gallons per square yard. Stone chips were then spread, and the base was rolled. Following this, a sand cushion 1 inch or more in depth was spread on the asphalt macadam base, and on this cushion the granite blocks were relaid.

After the blocks were laid, and a small amount of stone chips had been swept into the interstices, the joints were filled with asphalt. Sufficient asphalt was spread so as to slightly flood the surface of the blocks for about one-third their area.

When the asphalt filler had been applied, the surface was covered with clean stone chips and rolled, after which the street was open to traffic.

The engineers in charge are thoroughly pleased with the results, and the street offers an excellent thoroughfare for heavy traffic, with a minimum of noise. This street is subjected to continuous heavy haulage.

Traffic Street Plan and Boulevard System Adopted for Portland, Oregon

By Charles H. Cheney

Consultant to the Portland City Planning Commission

WITH cities all over the country studying street traffic congestion problems, definite steps to solve them, taken in any city of size, are watched with interest. Many schemes and regulations for handling traffic are being tried out, but there seems to be no permanent solution except the linking up and widening of a few conveniently located through routes, which will anchor the flow of traffic and make a sound basis for the location of business buildings, and of the stores and offices dependent on traffic for their success. Municipal officials, however, are probably as much worried about the rapidly increasing number of street accidents and the convenience of the general public as they are about stabilizing traffic for the sake of business.

Numerous cities are now, through their city planning commissions or other specially created investigating bodies, preparing comprehensive plans for relief, and setting about their execution in businesslike fashion. Detroit is opening up great cross-town arteries at considerable expense. St. Louis has a number of streets down-town in the process of widening, following the practical and comprehensive Major Traffic Street Plan completed by its City Planning Commission in 1917, and described in previous articles in *THE AMERICAN CITY*. The Chicago Plan and the tremendous improvements already carried out or being guided to execution by the Chicago Plan Commission are well known and are bringing enormous advantage to the development of business in that city. Many other smaller cities across the country and on the Pacific Coast have their plans, and improvements are rapidly being made to solve these difficult new traffic problems, brought upon us by the fast-increasing use of the motor vehicle.

The Major Traffic Street and Boulevard System Plan recently completed and adopted for Portland, Ore. (260,000 population), while summing up in the main the experience and practice of most of the other cities

that have seriously studied the matter, contains many constructive points of interest to all cities endeavoring to solve such problems. A brief summary follows showing the conditions found and conclusions reached.

Reasons for a Major Traffic Street Plan

It is more and more evident that in the future through travel should be limited to a few conveniently located traffic streets, on which ordinary drivers once in the stream of travel can know that they are safe, and move steadily ahead, and on which reckless ones can be more easily and economically regulated.

Commercial vehicles and hauling should be limited to a few definitely established major traffic streets until they have reached the nearest point to their destination. Only thus can we furnish enough heavy traffic pavements to satisfy traffic needs, or pay the bills for their making and up-keep.

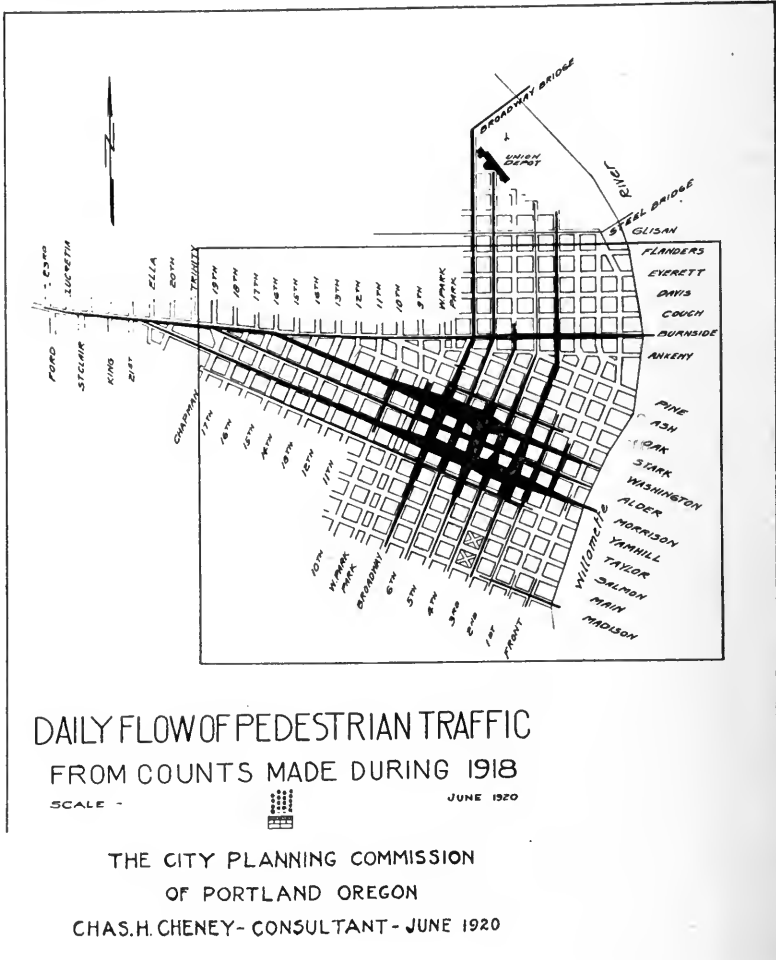
The approval of the City Planning Commission is required by state law in Portland, as in many other cities of the country, on all maps of new land subdivisions, both within the city limits or for six miles outside. In passing on the twenty-six such maps submitted to it during the last eighteen months, the Portland Commission found that it must have a general plan of major traffic streets, or through leads, for its guidance. The Major Street Plan just adopted is comprehensive and will serve to convince owners of new tracts as to the necessity of a few wide and continuous through streets laid out in advance.

The wear and tear is so great, the danger to children and pedestrians so serious, and the cost of permanent wide traffic pavements and their up-keep so large, that cities can afford to have only about every sixth or eighth street established and paved as a traffic street.

The greatest number of street accidents to-day are caused by reckless turning in or crossing at side streets. Once a compre-

hensive system of major traffic streets is settled on, all cars can be required to come to a dead stop before turning from a minor or side street into an established traffic street. Chicago already has such a system partially in effect. The Police Traffic Bureau and City Planning Commission recommend it for Portland.

The balance, or minor residence streets, comprise 85 per cent or more of our total system in most cities. For these minor streets Portland has adopted a minimum roadway of 20 feet between curbs, thereby making a saving of \$112 a lot in paving cost, and it is expected that these narrow roadways will be safer, quieter, less attrac-



Streets Should Be Arranged to Suit Their Use

During the last fifteen years the coming of the fast motor vehicle with trailers carrying heavy loads amounting sometimes to as much as ten or twelve tons on two wheels has made necessary more permanent and heavy, hard surface pavement, and more direct through routes. These form the major traffic streets.

tive to speeders, and yet take care of all the traffic which originates or ordinarily has business on them. The Portland Commission found that millions of dollars of needless and over-wide paving has been put down on such streets in the past, and estimates that several hundred thousand dollars, at least, will be saved taxpayers in the next five years on new paving by settling now which streets will not be needed for

through traffic and wide pavements.

With a complete system of traffic streets decided upon, minor streets can be closed in industrial zones without question, wherever so desired for business reasons. Fewer cross-streets in residence districts would reduce the cost of land, by eliminating the land lost in such streets, and their paving cost. Portland has 200-foot-square blocks in a large part of the city, and the closing of alternate minor cross-streets is recommended. Home ownership was found to be discouraged and possibly seriously deterred by the unnecessary burden of over-wide street paving on minor streets in the past.

In paying for paving on traffic streets through valued residence districts it was recommended that the abutting residence owners be not required to pay more than they would have to if located on a minor street, a benefit district on either side and the city or county out of its general fund making up the difference.

Three Kinds of Streets Found Necessary

For economy, safety and convenience it is necessary to divide all streets into three general classes, according to their use.

1. *Major traffic streets and thoroughfares* should be located to give direct access by shortest route, carry unlimited traffic and be unobstructed as far as possible by street-car lines or railroad grade crossings. They should be not less than 80 feet in total width both within the city and leading out into the country for an average of 6 miles. In Portland some eight principal thoroughfares of 100 feet in width are recommended, and water-front hauling streets of 120 feet.

2. *Boulevards and parkways* should be indirect in route so as purposely to avoid being later appropriated as traffic routes, and should exclude commercial vehicles and truck hauling. Direct routes should be adopted only when closely paralleled by a major traffic street.

It is a well understood practice, in cities having developed boulevard systems, that all boulevards should be not less than 150 feet wide, and preferably 200 feet wide. This width is necessary to secure ample permanent parking strips for double or triple lines of trees on each side of the main roadway. Such parking and planting are what make a boulevard desirable, refreshing and useful, as distinct from ordinary or traffic streets.

Business should be prohibited by zone ordinance on all real boulevards of the permanent boulevard system.

3. *Minor residence streets*, which comprise about 85 per cent of the total in the city, should be protected from the intrusion of needless traffic, to preserve the safety, quiet and comfort of people living on them. Forty- and fifty-foot streets should be accepted where building setback lines are permanently established by the city in the future. They should be paved with 20-foot roadways or less, except where there are street-car lines.

Like most cities, Portland is already compactly built up down-town, and for a considerable distance out from the main center. Changes in streets, in these portions of the city at least, would be expensive and can only be undertaken where relief from present or future congestion makes them imperative. In the Major Traffic Street and Boulevard System plans adopted, every widening, extension or new street proposed has been carefully weighed by the City Planning Commission, as to its practical purpose and value, and only such proposals included as seem justified in cost for relief of traffic congestion.

This plan does not contemplate all these improvements at once, nor for some time to come. In fact, most of the widenings shown as ultimately necessary may be put off for one, and in some cases two, decades, if the recommendations made as urgent are put into effect reasonably soon, and always in accordance with such a predetermined plan. Establishment of 10-foot building setback lines on each side of many of the major traffic streets now only 60 feet wide will suffice for a number of years.

Benefits Expected From Adoption of a Major Traffic Street Plan

J. C. Ainsworth, President of the Portland City Planning Commission, says of the report of the Commission:

"The Major Traffic Street, Boulevard and Park System Plan will go far to solve many of the city's most serious problems.

"This plan, if adhered to, will save thousands of dollars of needless over-wide street paving by designating the 85 per cent of our streets which will not be needed as through traffic streets. It will help the small home owner by establishing definitely the minor residence streets, where the burden of paving can be cut in half. It will save more money by

Proclamation

Make 1921 a Year of Gifts to Portland

To the People of Portland:—

Let us make 1921 a year of gifts to Portland.

We are building a great city. Nature has endowed us with greater scenic gifts than are possessed by any other large city of our country. To make our city now as accessible, useful and beautiful as it should be is a task which commands the best efforts of every citizen.

Automobile tourists and travelers are just discovering Portland. Splendid state highways are nearing completion. Our Portland traffic ways and boulevards should be linked up with them without delay. We need more base-ball grounds, and larger playgrounds at our schools. Every child, and adult, too, anywhere in Portland should have full opportunity for healthy recreation. We need large, wild parks, and more mountain parks. We must depend upon the generosity of our citizens to save such spots and present them to Portland before the desired tracts are broken up or built upon.

In the past we have had some splendid benefactions. The man of modest means who gave us the beautiful ten acre Shepherd's Dell Park, on the Columbia River Highway, did no less a permanent public service than he who gave us for all time the wonderful Multnomah and Wahkenah Falls, with their 740 acres of Park, or Terwilliger Boulevard, or the beautiful fountain at Second and Ankeny Streets.

The City Planning Commission for two years has been carefully listing the city's needs, and with the help of the Advisory Park Board has perfected a general boulevard and park system plan which should be completed as fast as possible. All citizens who will participate in the campaign are requested to get in touch with the Commission's office, Room 424, City Hall, and see what the needs are. Gifts to the city should be outright, without restrictions.

I ask civic organizations to name committees to seek gifts for the city in cooperation with this Commission. At the end of the year public acknowledgment will be made to the organization bringing in what, in the opinion of the City Planning Commission and Advisory Park Board, is the most important gift to Portland in 1921.

Portland today is entering its greatest and most important era. The recent order granting justice, so long denied the city, in freight rates to and from the Inland Empire, inauguration of the world port program authorized by the city and the legislature, the location of many new industries here, and other constructive steps being taken by city, county, and state, including plans for the 1925 Exposition in this city, bring promise of equally increased prosperity and responsibilities to all.

Let us now do these generous and public spirited things, for which the city must wait many years unless it has unusual aid from its citizens.

February 23, 1921.

GEO L BAKER, Mayor

RESOLUTION OF THE CITY COUNCIL

Whereas, Portland has had in the past some splendid public gifts, that reflect great permanent credit, both upon the donors and the city, and

Whereas, we are now confronted with the need of many playgrounds, parks, boulevards and traffic streets, which there are no public funds available to purchase, and

Whereas, a committee of public spirited citizens working with the City Planning Commission and Advisory Park Board propose to make these needs known to the people of the city, in a campaign during 1921, now therefore be it

Resolved, that the City Council of the City of Portland, hereby gives its hearty approval and endorsement to this campaign to "make 1921 a year of gifts to Portland" and promise our hearty cooperation, it being understood that final acceptance of any gifts by the city shall be preceded by full consideration of the Council. We are confident that this great civic effort is conceived in a spirit to put Portland ahead and to make it the most convenient, comfortable and attractive city on the Pacific Coast, and we bespeak the assistance of all citizens and civic organizations in carrying it through to the greatest possible successful conclusion.

Adopted by the City Council of the City of Portland, February 23, 1921.

Ayes—Commissioners Baker, Barbur, Bigelow and Pier.

Noes—None. Absent—Commissioner Mann.

GEO. R. FUNK, Auditor.

By W. D. Smith, Deputy.

AN INSPIRING APPEAL TO CITIZENS OF PORTLAND, ORE.

From ancient times, public-spirited citizens have found satisfaction in offering gifts to their

stabilizing the down-town centers of traffic, thereby preventing unwarranted shifting of the retail center, with consequent depreciation and loss, while allowing for reasonable expansion of the business district in all directions.

"It will save time for everyone, by relieving traffic congestion in all parts of the city. It will increase safety on our streets and should reduce street accidents by half, by establishing traffic streets at which a dead stop of all cars turning in from side streets can be required, as in some eastern cities.

"It provides a system of boulevards passing all the principal points of interest in the city and making the most of Portland's scenic attractions. The linked-up system of highways, city and mountain drives provided will attract tourists from all parts of the United States. The carefully selected locations for playgrounds and parks will save thousands of dollars to the city and the school board by eliminating duplications in playground and field house facilities.

"A comprehensive and practical plan of development is provided for us all to work to, so that investors may know where traffic is going and build accordingly."

Portland City Plan Brings in Gifts

Upon the completion of the major traffic street and boulevards and park system plan for Portland, and its adoption by the City Planning Commission and the Park Board, it was evident that many of the new through routes would increase adjoining property values and were of such importance to large property owners particularly that they could

well afford to make large donations to the city. There were many small property owners also who, both through civic pride and a desire for more wide main roads, were willing to give extra widths of roadway along the front of their lots to help the city.

In order to do as much for the city as possible without cost, and to prove that city planning pays, the Commission asked the Mayor to issue the proclamation reproduced on the opposite page. This was done February 26, 1921, and the City Planning Commission organized committees in all the principal civic bodies to see which would bring in the most notable gifts for Portland during the year.

While no public announcement of the exact gifts so far offered the city has been made, the Commission has taken the Mayor and Council to see the first fifteen pieces of property offered up to May 1, and deeds are now being prepared for over 27,000 lineal feet of new traffic ways, boulevards and parkways, none of which are less than 100 feet in width and most of which are 150 and 200 feet in width.

Before the end of the year the Commission expects to receive and file deeds with the city for several times this amount of new boulevards, parkways and much-needed traffic streets.

On the Calendar of Conventions

JULY 3-8.—DES MOINES, IOWA.

National Education Association of the United States. Annual meeting. Secretary, J. W. Crabtree, 1400 Massachusetts Avenue, N. W., Washington, D. C.

JULY 11-13.—AUSTIN, TEX.

Texas Commercial Executives' Association. Annual meeting. Secretary, F. N. Clifford, Yoakum, Tex.

JULY 17-31.—EVANSTON, ILL.

National School for Commercial Secretaries. Address Northwestern University, Evanston, Ill.

JULY 21-23.—OAKLAND, CALIF.

American Physical Education Association. Annual convention. Secretary, Dr. J. H. McCurdy, 93 Westford Avenue, Springfield, Mass.

AUGUST 1-8.—PALO ALTO, CALIF.

Western Summer School of Community Leadership. Address Charles A. Simmons, Western Manager, American City Bureau, Merchants' Exchange Building, San Francisco, Calif.

AUGUST 9-12.—THREE RIVERS, QUEBEC.

Dominion Association of Fire Chiefs. Annual convention. Secretary, James Armstrong, Kingston, Ontario.

AUGUST 10-12.—CHICAGO, ILL.

International Association of Street Cleaning Officials. Annual conference. Secretary, A. M. Anderson, 1340 Old Colony Building, Chicago, Ill.

AUGUST 15-26.—MADISON, WIS.

Summer School of Community Leadership. Address Ralph G. Stoddard, Business Manager,

American City Bureau, Tribune Building, New York, N. Y.

AUGUST 16-18.—SIOUX CITY, IOWA.

League of Iowa Municipalities. Annual meeting. Secretary, Frank G. Pierce, Marshalltown, Iowa.

AUGUST 21-28.—CHAUTAUQUA, N. Y.

Open Forum National Council. Annual meeting. Secretary, Robert S. Holmes, Daytona Beach, Fla.

AUGUST 23-25.—DETROIT, MICH.

American Association of Park Superintendents. Annual meeting. Secretary, Emmett P. Griffin, Superintendent of Parks, East St. Louis, Ill.

AUGUST 23-25.—BUTLER, PA.

League of Cities of the Third Class in Pennsylvania. Annual convention. Secretary, Fred H. Gates, City Clerk, Wilkes-Barre, Pa.

SEPTEMBER 6-8.—CINCINNATI, OHIO.

American Society of Sanitary Engineering. Annual convention. Secretary, Aden E. Smith, care of Board of Health, Cincinnati, Ohio.

SEPTEMBER 13-15.—DETROIT, MICH.

Association of American Cemetery Superintendents. Annual meeting. Secretary, W. B. Jones, Highwood Cemetery, Pittsburgh, Pa.

SEPTEMBER 13-16.—BRIDGEPORT, CONN.

New England Water Works Association. Annual convention. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston, Mass.

SEPTEMBER 26.—BOSTON, MASS.

National Safety Council. Annual Safety Congress. Secretary, S. J. Williams, 168 North Michigan Avenue, Chicago, Ill.

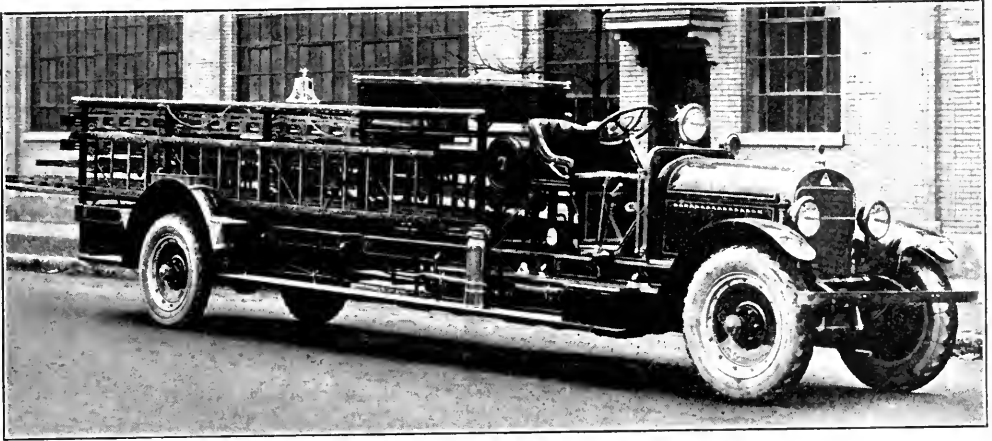
Progressive American Cities Seek Full Motorization of Municipal Departments



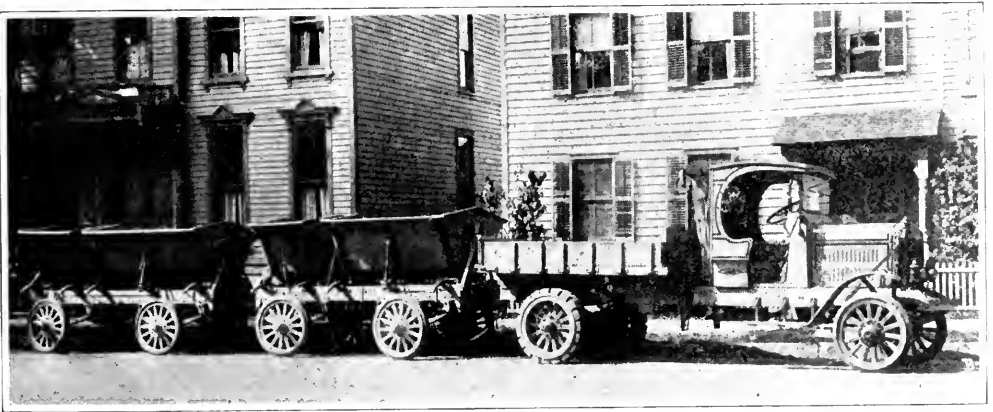
HARLEY-DAVIDSON MOTOR-CYCLES ARE A PART OF THE EQUIPMENT OF THE MILWAUKEE, WIS., FIRE DEPARTMENT. CARRYING A NUMBER OF HAND EXTINGUISHERS, THEY CAN REACH A FIRE MINUTES AHEAD OF THE OTHER APPARATUS, AND HAVE PROVED VERY EFFECTIVE



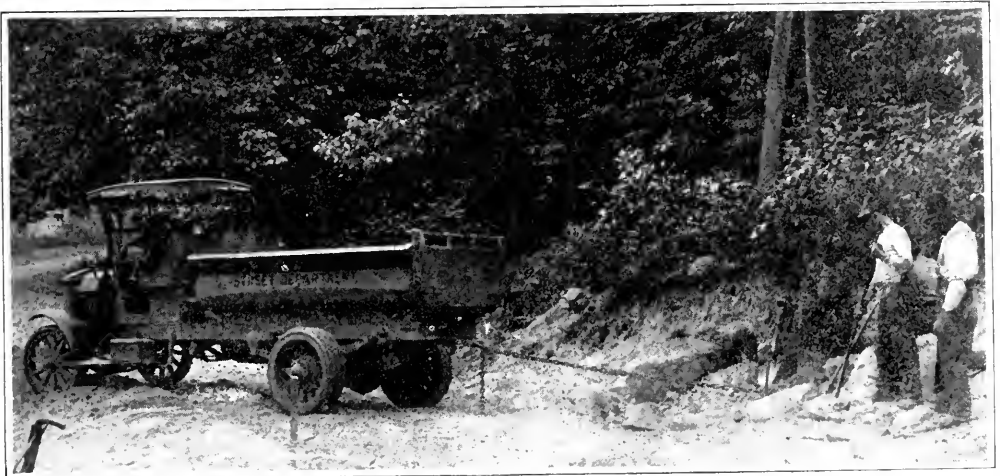
AMERICAN-LA FRANCE HOOK AND LADDER OWNED BY THE FAME FIRE COMPANY, WEST CHESTER, PA.



A STUTZ HOOK AND LADDER TRUCK WITH FIELD EQUIPMENT



A LARRABEE-DEVO TRUCK WITH A TRAIN OF TROY TRAILERS IN USE IN BINGHAMTON, N. Y.



THIS 3 1/2-TON FEDERAL IS THE "JACK OF ALL TRADES" OF THE LACONIA, N. H., STREET DEPARTMENT

The truck is called upon to haul and spread gravel and stone, and is here shown pulling out a boulder

Methods of Financing Municipal Street Lighting

By H. L. Dollahan

WHEN a city begins to plan a White Way installation, the financing of the installation is the first problem that must be solved. There are several plans that have been used in the financing of such city improvements.

Popular Subscription Method

Generally, local conditions must be considered in choosing the best way to finance an installation. A method that is more or less popular in the South is to raise the money by a subscription among the property owners, the city occasionally contributing a certain amount out of its general funds. However, if care is not taken in the use of this method, the scheme is apt to fall through. It should be pushed through and closed while every one is interested in the matter.

To successfully put this matter of financing across, the business-building value of a White Way must be impressed upon the local merchants. Talk about the advantages of better street lighting in the local newspapers, have posters featuring the new lighting printed and distributed, and have street lighting specialists give talks before the various civic organizations and commercial clubs. Also call upon each merchant that has a store on the street to be lighted and talk better street lighting to him.

When enthusiasm is at its height, have representative citizens take out subscription lists—preferably two or three men in each block. It is sometimes best not to ask the merchant for any specific amount, but rather to pledge his support. The petition or subscription list should be headed with the name of the town, the street to be illuminated, and, if possible, the number of feet abutting on the improvement district, as follows:

"We, the undersigned citizens (property owners) of Progress City, Texas, do hereby pledge ourselves to pay for a White Way to be installed on Main Street between Clark Street and First Avenue, it being understood that our share will not be more than three dollars (\$3.00) per front foot of property

owned or occupied by us and fronting on Main Street between Clark Street and First Avenue."

Financing by the Central Station

Another method of financing which has been popular in certain localities is for the lighting company to furnish and install all material and charge the city a stipulated rate for current and maintenance, which would include interest on the investment and depreciation. This method is especially popular in the state of Michigan, where the state law does not recognize street lighting as a permanent improvement.

Probably the most common method of financing White Way improvements in such states as Illinois, Indiana, Wisconsin, Minnesota, Montana, and all other states in which the public improvement law pertaining to street paving and sewer systems is applicable to White Way installations, is to assess the property abutting on the street in which the lighting system has been installed for the full cost of the improvement.

Some states, like Illinois, assess on a front-foot basis. Wisconsin assesses on the valuation of the property. In Ohio, a municipality may install a White Way system on any public street upon the petition of owners of adjacent land with a valuation amounting to three-fourths of that of all the property affected, and special assessments may be levied upon such owners for a part or all of the cost. The assessments so levied may be collected in one or more instalments in the manner provided in the case of assessments for street improvements, and the legislative body may levy and provide for the collection of such assessments at any time before or after the completion of the lighting system. Any such assessing ordinance may be made to include the property specially benefited by such lighting system, and may also include property abutting upon any one or more streets or public places, or parts thereof, which are lighted by it.

In other states, such as Michigan, in which the city charter does not recognize

White Way lighting as a permanent improvement, if the installation is not financed by the lighting company, the city is compelled to install the system out of the general fund. Indiana handles such matters in practically the same way as Illinois, except that ornamental lighting can be installed only on streets which are paved and where at least 50 per cent of the lots or parcels of land on the blocks on which the lamps are to be installed are occupied by buildings used either for business or residential purposes.

Seventy-five per cent of the owners of such real estate abutting on the improvement district as set forth above are required to sign a petition for the lighting improvement, and in no event is the lighting system to be installed where the cost exceeds 20 per cent of the assessed value of the lots. The assessments covering this cost are payable in two annual installments after the system is installed.

Securing White Ways by State Laws

In states where they recognize White Way installations as coming under the public improvement laws, there are two methods of properly presenting the subject before the city council, or the commission form of government.

The first method is for the property owner to sign and present a petition to the board of local improvements, the number of the signatures required by the various states varying from 50 to 75 per cent. Such a petition would request the board of local improvements to create a lighting district, draw up plans and specifications, as well as estimate the cost of the work and call for a public hearing. Naturally, there will be little protest at a public hearing, since the petitioners have asked for the improvement. The board of local improvements after the hearing instructs the city attorney to draw up an ordinance and the engineer to prepare his plans and specifications for the installation, certified copies of which are placed on file with the county judge, who must authorize the assessment spread and give authority for collecting it. The city council then passes the ordinance creating this improvement district and issues the call for bids.

The other method is the same as explained above, except that the board of local improvements can create at its option

a lighting district without a petition's being presented, but frequently the objections given at the time of the public hearing are enough to counteract or forestall the improvement, at least for the time being.

Methods of Financing Adopted by Various Cities

Following are the methods adopted by several cities in various parts of the country for solving their financing problems:

Albert Lea, Minn.—Original installation purchased and installed by the lighting company, a higher rate being charged to compensate for the investment. The cost of current included in higher rate is paid by the city out of general fund.

Duluth, Minn.; Charleston, W. Va.—Merchants paid cost of lamps and fixtures. Electric light company paid for rectifier, globes and wire. City pays for operation.

Huntington, W. Va.—Property owners pay for entire installation. City buys current and pays for operation.

Gastonia, N. C.—Municipal plant. City pays for all.

Wilmington, N. C.—Light company installed complete. City pays for up-keep and current.

Greenville, S. C.—Light company installed complete system. City pays for operation.

Shelby, N. C.—Municipal plant. City installed and operates it.

Raleigh, N. C.—City paid for poles and hardware. Light company furnished lamps, rectifiers. City pays for current.

Bellefonte, Pa.—Light company installed system, furnishing lamps and rectifiers. City furnished other equipment and pays for maintenance.

Allentown, Pa.—Light company installed. City pays for current.

Cumberland, Md.—City pays for installation and maintenance.

Wilmington, Del.—Light company installed. City maintains and operates.

Philadelphia, Pa.—Light company installed. City maintains and operates.

Easton, Pa.—Municipal light plant. City installed and maintains.

Baltimore, Md.—Light company installed. City maintains.

Washington, D. C.—Light company installed. City maintains.

Bridgeton, N. J.—Light company installed. City maintains.

Ironton, Minn.—Original installation purchased out of general city funds. Cost of current and maintenance paid by city from general fund.

Dell Rapids, S. Dak.—Handled same as Ironton, Minn.

Fergus Falls, Minn.; St. James, Minn.; St. Paul, Minn.; Livingston, Mont.—Original installation is assessed against the property owners abutting on the improved district, and the cost of maintenance is paid for by the city out of its general funds.



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Municipal Finance

BONDING

ACCOUNTING

TAXATION

Uniform Accounting Classification for Illinois Cities

By Lloyd Morey, C. P. A.

Comptroller, University of Illinois

A COMMITTEE of financial officers from various Illinois cities has been at work for some time under the Illinois Municipal League endeavoring to develop a uniform classification of accounts for Illinois cities. Illinois has no laws requiring uniform accounting methods in cities, or uniform reports. Development along this line, therefore, has been somewhat retarded. The Illinois Municipal League hopes to secure the establishment of uniform systems of accounts and reports through the activities of its special committee. The members of the committee are J. J. Crowder, Comptroller, Peoria; M. T. Rudgren, Commissioner of Finance and Accounts, Rock Island; Frank Wynkoop, Comptroller, Springfield, and Lloyd Morey, Comptroller, University of Illinois, Chairman.

The first report of the committee was presented at the annual meeting of the League in Springfield on February 2 and 3. The report dealt with classification of receipts and expenditures. Further studies of the committee will be directed toward uniformity in balance sheets and in accounting forms.

The report of the committee as presented in February was adopted by the League, and is as follows:

General Classification Outline

- (1) Receipts
 - A. As to *source* (Schedule I)
 - B. As to *fund*, following the ordinances and practice of each respective city
- (2) Expenditures
 - A. As to *departments* (Schedule II)
 - B. As to *fund*, following the ordinances and practice of each respective city
 - C. As to *service* and commodity, such as salaries, wages, supplies and materials, equipment, etc. (each depart-

ment is to be analyzed as its expenditures may require)

Schedule I

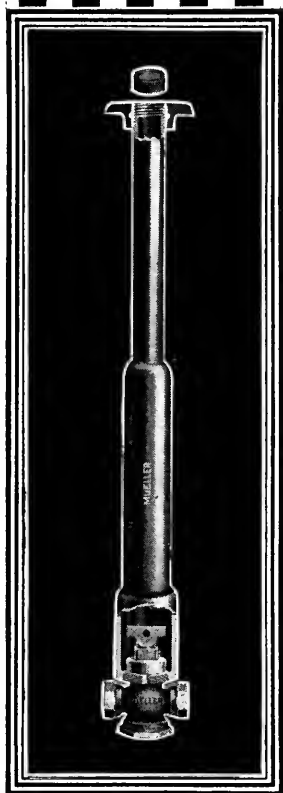
Classification of Receipts

- I. Revenue Receipts (divide each of the following items, as necessary)
 - A. General Taxes
 - B. Special Taxes (not including special assessments (see II B) or pension funds (see II D))
 - C. Licenses, franchises, and privileges
 - D. Fines
 - E. Departmental earnings (not including municipal utilities—see II C)
 - F. Miscellaneous
- II. Non-Revenue Receipts
 - A. Receipts from loans, anticipation warrants, bonds, etc.
 - B. Receipts from special assessments (itemize)
 - C. Receipts of public service enterprises (municipal utilities—separate account for each)
 - D. Trust and special funds, including only pension funds, sinking funds, and the like

Schedule II

Classification of Expenditures

- I. Expense and Interest
 - A. Corporate expense (salaries, materials, and miscellaneous, but not including equipment) (see II B)
 - i. General Government (public affairs, and accounts and finance)
 - a. Mayor (salary and office expense)
 - b. Council or Commissioners (salaries, printing, etc.)
 - c. Legal Department (salaries and office expense)
 - d. Comptroller (salary and office expense)
 - e. City Clerk (salary and office expense)
 - f. Treasurer (salary and office expense)
 - g. Election expenses (including expenses of election commission)



MUELLER Improved Extension Service Boxes

This **MUELLER** improvement over the old type screw adjustment box, permits the raising or lowering of the upper section without injury to the curb cock or service.

The large case insures stability — the lid is practically indestructible—yet the materials used give excess strength coupled with lighter weight—effecting a decided saving in freight.

Made with 1¼", 1½" and 2" upper sections, they will accommodate a range of water or gas curb cocks from ½" to 2", as desired.

MUELLER Service Box Repair Lids are easily attached, and when applied make the old box better than it was originally. Many new boxes are now ordered equipped with **MUELLER** Repair Lids.

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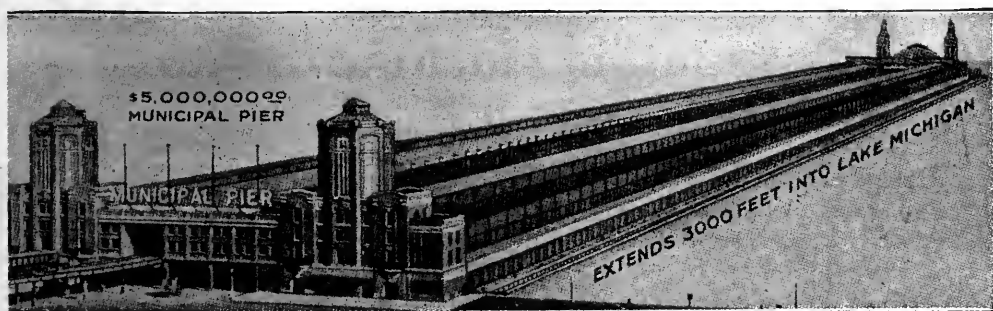
- h. Judicial Departments (Police Court or other courts)
 - i. Civil Service Commission
 - j. Contingencies
 - 2. Public Health, Safety, and Sanitation
 - a. Police Department
 - b. Fire Department
 - (1) Salaries
 - (2) Materials and supplies
 - (3) Fire alarm system
 - c. Inspections (building, electrical, plumbing, milk, etc.)
 - d. Health Department
 - e. Garbage
 - f. Hospitals and Sanitariums
 - 3. Public Works and Property
 - a. Engineer
 - b. Board of local improvements
 - c. Streets and subways
 - (1) Cleaning
 - (2) Repairs
 - (3) Sprinkling
 - (4) Oiling
 - d. Sidewalks
 - e. Sewers and drainage
 - f. Bridges, wharves, and waterways
 - g. Street lighting
 - h. Public buildings
 - i. Scales
 - j. Cemetery
 - 4. Parks and Playgrounds
 - 5. Libraries
 - B. Interest and Redemption of debt (including payments out of corporate revenue for interest on indebtedness and redemption of debts, and contributions to sinking fund)
- II. Capital Outlays
- A. From corporate revenue (see I A)
 - 1. Departmental (by departments)
 - 2. Public benefits for local improvements (itemize)
 - B. From general bond issues (itemize)
 - C. From special assessment funds (including redemption of bonds out of these funds) (itemize)
 - D. From receipts of public service enterprises (III)
- III. Public Service Enterprises (municipal utilities)
- A. Water-works (analyze as necessary)
 - B. Electric light plant (analyze as necessary)
- IV. Trust and Special Funds
- A. Police pension fund
 - B. Fireman pension fund
 - C. Sinking funds

Chicago's Exposition Will Help to Revive Industry

CHICAGO has taken the lead in bringing every encouragement in her power to bear upon the revival of industry. From July 30 to August 14 there will be held on the Municipal Pier probably the most remarkable industrial and educational exposition ever presented in this country.

In addition to commercial displays, both domestic and foreign, there will be others of distinct municipal interest. The Health and Sanitation Exhibition given at the

Coliseum last November will be repeated. Nor will the important fact of public safety be overlooked. There will be complete displays of fire-fighting apparatus and several exhibits showing how accidents in industry have been reduced 60 per cent since 1912. An exhibit of public utilities will be especially interesting, showing how gas, water-heat from central plants, and other commodities have replaced the tallow candle, the old oaken bucket, and the wood-pile.



CHICAGO'S MUNICIPAL PIER IS AN IDEAL LOCATION FOR A SUMMER EXPOSITION

The Monroe Is Paying Big Dividends To Duluth

IN the office of Duluth's City Engineer everything is run on a high plane of efficiency. And the city engineer doesn't hesitate to give due credit to the Monroe Calculating Machine for the part it has played.

"The Monroe has paid for itself several times over," he writes, "and it would be difficult for us to get along without it."

On the Monroe you can add, multiply, divide and subtract, with a constant proof of accuracy always before you.

And so simple to operate. Merely set the numbers on the Monroe keyboard and turn the crank—forward for addition and multiplication, backward for subtraction and division.

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*On the coupon below, ask for a demonstration or the folder
"How New York State Saved \$85,000."*

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Duluth, Minn.
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ground.

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Monroe Calculating Machine Co., Woolworth Bldg., New York.
Without obligation (check items desired)

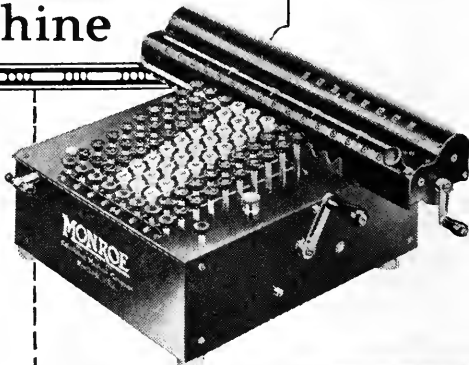
Arrange for a demonstration in our office on our own work.
] Send us folder, "How the State of New York Saved \$85,000."

Department.....

My Name..... Title.....

Address.....

AC-7-21



Chamber of ***** Commerce Activities in Public Affairs

Summer Schools During July and August

Secretaries of chambers of commerce and others interested in community leadership will have ample opportunity during July and August to gain information and inspiration for their fall and winter tasks.

A special one-week course in community leadership will be conducted jointly by the American City Bureau and the University of Oklahoma at Norman, Okla., July 11 to 16, and a similar course will be conducted the following week in cooperation with the University of Colorado, Boulder, Colo.

From July 17 to 31 will be held a "National School for Commercial Secretaries" at Northwestern University, Evanston, Ill., under the auspices of the Chamber of Commerce of the United States; the National Association of Commercial Organization Secretaries, and Northwestern University.

A Western Summer School of Community Leadership will be conducted by the American City Bureau at Stanford University, Palo Alto, Calif., August 1 to 6; and the big annual Summer School of the American City Bureau will be held this year, as last, at the University of Wisconsin, Madison, Wis., August 15 to 26.

Chamber Suggests Improvements for City Departments

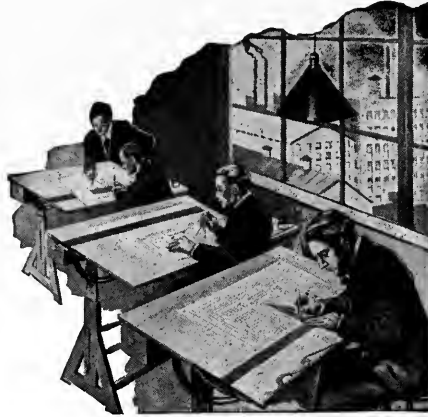
TOLEDO, OHIO.—The report recently submitted to the Mayor, civic organizations and general public of Toledo, dealing with the expenditures of the city government and the degree of efficiency secured in the operation of the municipal departments, came as the result of an investigation determined upon at a meeting held in the office of the Mayor on November 22, 1920. The meeting was called by the Mayor after certain criticisms had been made by some of the luncheon clubs, calling attention to the large expenditures of the municipality and voicing their dissatisfaction with the manner in which a number, at least, of the departments of the city were being operated.

The following civic organizations were represented at the meeting: The Toledo Chamber of Commerce, Rotary Club, Central Labor Union, Exchange Club, Kiwanis Club, Lions Club and Ad Club. After considerable discussion it was decided unanimously by those present that an investigation of municipal government conditions in Toledo be ordered, and the Mayor drew a resolution providing for the appointment of the Director of the Public Service Bureau of The Toledo Chamber of Commerce to conduct the investigation and make a report to the officials and general public of Toledo.

The report recently submitted is the result of the investigation which has been made in the meantime. The entire cost of the investigation was borne by The Toledo Chamber of Commerce. The report when completed was presented to a committee of four prominent citizens, who unanimously endorsed it. It was also approved unanimously by the President and Board of Trustees of The Toledo Chamber of Commerce.

The report goes into considerable detail with regard to the practical operation of most of the municipal departments, gives comparative figures of costs covering a period of years, makes many criticisms of conditions which call for the application of remedies, and makes recommendations (thirty-two in number), with the reasons for their advocacy.

Every effort was made in presenting the report to avoid the confusion too often consequent in the public mind on the presentation of reports containing a large and complicated mass of figures, the figures used in the report being presented only where necessary to give the general public an adequate idea of actual conditions, and to drive home its salient features. The findings of the report included thirty-two specific recommendations, of which a few are given on page 63.



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MEDART

The two evening papers in Toledo gave the report splendid support in publicity. This coöperation on the part of the press proved of great assistance in getting the report into the homes of the citizens, where they had an opportunity to read and thoroughly digest it.

The real value of a report of this nature lies in the influence it exerts in forming, moulding and energizing public opinion. Every effort was made to present the report in language and form to attract and hold the attention of the average citizen, and from the general interest manifested in the community there is every reason to believe that this result has been secured.

The Mayor has already taken steps to put into practical effect some of the changes suggested. A reorganization of the Division of Streets is now being planned, which will undoubtedly result in securing economies and rendering a more satisfactory service.

The importance of following up a report of this kind containing so many recommendations and suggestions is readily apparent.

It is the purpose of the Chamber of Commerce—if persistence and patience can accomplish anything—to secure for the community the benefits that it is clearly apparent can be secured from the carrying out of the recommendations made in the report.

J. R. COWELL,

Director, Public Service Bureau, The Toledo Chamber of Commerce.

Chamber of Commerce Investigation Reduces Paving Costs

LOWELL, MASS.—Granite block paving done by the city has cost Lowell approximately \$10 per square yard. The Chamber of Commerce investigated the situation and got information to show the city government that similar paving could be done by contract, using Lowell labor, for \$4.75 per square yard, about half the price paid in 1920. Better work by contract was guaranteed also.

The Chamber made recommendations on this investigation to the City Council, and now plans to continue the agitation until paving costs are reduced. Under local circumstances the amount of paving could be doubled and twice the number of laborers could be employed by contract work. Lowell needs street construction, but the city cannot pay \$10 per square yard for it.

During the last month the Chamber also advised the City Purchasing Agent to buy cement on a guarantee price basis to guard

against unstable market conditions for that commodity.

EDWARD W. GALLAGHER,

Assistant Secretary, Lowell Chamber of Commerce.

Close Relations Between Chamber of Commerce and High School

ATTLEBORO, MASS.—The Chamber of Commerce of this city has been actively endeavoring to create a definite interest in the community on the part of the younger people, and believes that one of the best

Some Specific Recommendations of the Toledo Chamber

A strict compliance with the requirements of the charter regarding the preparation of the annual budget.

A careful study by officials and citizens of the merits of the city manager plan, and an opportunity afforded the voters, after reasonable consideration, to pass upon its adoption.

That the minimum service requirements before men in the divisions of fire and police are entitled to pensions be changed from twenty-five to thirty years.

That the fees charged in the division of inspection for certain services be raised to cover the cost of such service.

That the possible advantage to the city by the use of automatic street cleaning equipment be thoroughly enquired into.

That the funds of the water division be kept separate from those of other departments, and that this municipal utility receive credit for all interest received on surplus funds held in banks.

That a central city garage be put in operation, with a thorough record system showing cost of operation and maintenance of each machine, and that the water division be relieved of this burden.

That the work of the division of health be extended to cover more completely a service to the public along educational and preventive lines, under a public health official with special fitness and training, who will give his whole time and energy to the duties of the office.



Does Your Street Lighting Provide These Advantages?

- 1st—Safety from collision
- 2nd—Safety from attack
- 3rd—Safety from burglars
- 4th—Convenience in recognizing passers-by
- 5th—Convenience in avoiding obstacles
- 6th—Last but not least—Economy.



If it does not provide these things, then you do not have good street lighting.

BE sure the equipment you buy has the name Holophane stamped on the glass, showing it is made by the Holophane Glass Company. Genuine Holophane Street-Lighting Refractors are of two-piece, dust-proof construction, and control the light by means of scientifically designed prisms. Beware of singlepiece imitations that embody mere corrugations, not scientifically calculated prisms.

A lighting engineer will gladly confer with you about improving your street lighting if you will write to the General Electric Co., Schenectady, N. Y., or branches; The Westinghouse Electric & Manufacturing Co. (Geo. Cutter Works), South Bend, Ind., or branches; the Line Material Co., South Milwaukee, Wisconsin;

or

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of Light Control*

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Era In Street Lighting.*

ways to stimulate coöperation between the Chamber of Commerce and the school population is by some act which will incite ambition in school work.

After considerable study, a committee of the Chamber of Commerce came to the conclusion that a most appropriate inspiration to the students would be a bronze tablet on which would be inscribed annually the name of the High School student attaining the highest scholastic standing during the four years of his course. Such a tablet has therefore been prepared and presented to the High School by the Chamber of Commerce. It has been placed in the lobby of the school, squarely in front of the main entrance, where every student will see it every day of his school years—a constant reminder of the Chamber of Commerce.

In return, each year the senior class is expected to prepare essays on some community topic. While this activity is separate from the presentation of the tablet, it is nevertheless closely associated with the idea. The tablet should be a special help to the High School freshmen, laying emphasis as it does upon the present-day tendency not to realize the real purpose of High School work until too late in the course of education. As a further inspiration and evidence of this spirit of coöperation between the Chamber of Commerce and the High School, a meeting of all High School students was held in the High School auditorium, at which time the Mayor and the Municipal Council, the Municipal School Committee, the officers and directors of the Attleboro Chamber—good examples of grown-up high school students—were present for the purpose of presenting the bronze tablet to the High School. The Mayor, the President of the Chamber, the Superintendent of Schools, and the principal of the High School inspired the student body through brief addresses.

WALTER O. LOCHNER,
Secretary, Attleboro Chamber of Commerce.



A DAILY REMINDER TO ATTLEBORO STUDENTS OF THE INTEREST OF THE CHAMBER OF COMMERCE IN EDUCATION

Coöperating for Public Health

WATERBURY, CONN.—Realizing the value of greater coördination between the private health agencies and the municipal health department, the Waterbury Chamber of Commerce has finally presented a plan for coördinating the various agencies engaged in health activities in the city. With this in mind, a communication was sent to other American cities, principally the larger ones, which had so-called associations of social agencies. While nothing was found which compared exactly with the plans finally adopted for the Waterbury Public Health Council, the idea of coördination, and the value of it, were apparent from the success of other agencies. A definite plan for the Waterbury Public Health Council was then presented by Secretary Moore to his Board of Directors.

The plan is designed to promote greater coöperation and understanding among the various organizations engaged in and interested in problems of public health. It will prevent overlapping in the solution of these problems, foster the discussion in conference of the health problems of the cities, stimulate the interest of the public, and secure further public coöperation in these vital matters. It will provide a clearing-house for health information, and an organization that can function in an emergency.

This Public Health Council consists of representatives of the existing agencies of



Wretched condition of Kenilworth Avenue, Villa Park, Ill., before the use of Tarvia

Picture of same section after being constructed with "Tarvia-X" Note excellent condition of road today

Good Roads Boost Property Values—

YOU can easily see how Tarvia has improved property values along Kenilworth Avenue, Villa Park, a pretty suburb of Chicago, Ill.

Here was a stretch of road that was bumpy and "hard going" on even the best of days, while during the Spring thaw and after a heavy rain it was practically impossible to navigate.

That was its condition before the road authorities of Villa Park turned to Tarvia. Tarvia will make this road last for years. With but occasional inexpensive treatments with "Tarvia-B" as the traffic demands it, it will always be free from mud and dust, waterproof, frost-proof and traffic-proof. It has increased the

desirability of the abutting property many hundred per cent.

For these reasons Tarvia streets have the hearty approval of taxpayers everywhere. The story of Kenilworth Avenue is being repeated in many cities and towns all over the country.

Tarvia is a coal-tar preparation for use in constructing new roads or repairing old ones. One Tarvia road in your community will prove to you and your townspeople how Tarvia roads increase property values and decrease taxes.

Illustrated booklet telling about the various Tarvia treatments free on request.

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*For Road Construction
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Special Service Department

This company has a corps of trained engineers and chemists who have given years of study to modern road problems. The advice of these men may be had for the asking by any one interested. If you will write to the nearest office regarding road problems and conditions in your vicinity, the matter will be given prompt attention.

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Atlanta
Toledo
Cincinnati
The Barrett Company
Montreal
Toronto
Winnipeg
Vancouver

St. Louis
Minneapolis
Duluth
Columbus
Jacksonville
St. John, N. B.
Cleveland
Dallas
Milwaukee
Richmond
Houston
Halifax, N. S.
Cincinnati
Nashville
Bangor
Lafayette
Denver
Pittsburgh
Syracuse
Washington
Bethlehem

a public nature interested in public health work. Such agencies include, among others, the Chamber of Commerce, the Board of Health, the Associated Charities, the Rotary Club, the schools, both private and parochial, the Red Cross, and the various hospitals of the city.

The Directors of the Waterbury Chamber of Commerce authorized the Secretary to call a meeting of the social and health agencies of the city and present the plan to them. The meeting was held, and a temporary organization was started, which has now been made permanent and is already operating with marked success.

THOMAS F. MOORE,
Secretary, Waterbury Chamber of Commerce.

Chamber of Commerce Helps Finance Home Building

MORGANTOWN, W. VA.—During the week of May 16, Morgantown experienced perhaps one of the most unique campaigns or drives in the history of any town. It was a thrift week campaign, sponsored and handled by the Morgantown Chamber of Commerce, of which Major Charles C. Robinson is president. During this week members of the Chamber of Commerce put aside their private business and canvassed the city and the general community about Morgantown in the interest of new stock subscriptions for the eight building and loan associations that are doing business in that city.

These associations needed more money to carry on their work and to meet the demands made upon them for funds with which to build houses. The result was that a large number of shares of stock were written in the names of business men, craftsmen, University instructors, and students in the State University located at Morgantown and in the Morgantown High School. These associations had loaned \$585,000, largely on homes, since January 1, 1921, and money had become unusually "tight." Various committees were appointed by the Chamber of Commerce to handle the different districts, and the slogan was "Save Morgantown by Saving for Yourself."

As a result of the campaign it is expected that a still greater impetus will be given to building operations in that city and vicinity. It is conservatively stated by consulting engineers, architects and contractors that there are as many new homes contemplated

in the remaining months of the building season as are now under construction. This demonstrates the effectiveness of the Chamber's work.

A recent survey made for the Chamber of Commerce showed that on May 1, there were 593 houses under construction in greater Morgantown, a building record difficult to equal in any other city in the United States with a population anywhere near that of Morgantown—12,000, according to the recent census.

So necessary is the matter of additional funds to take care of the building situation that the Chamber of Commerce has also invited several outside building and loan associations in other cities in West Virginia, where there is comparatively little building, to come into Morgantown and place some of their ready cash at the disposal of Morgantown residents either through one of the Morgantown building and loan associations or by means of branch offices of their own organizations.

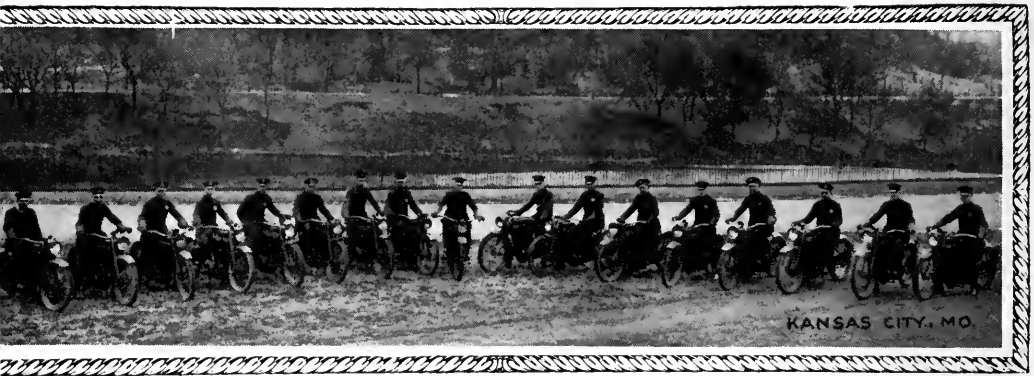
A. C. STEWART,
Secretary, Morgantown Chamber of Commerce.

Better Sidewalks Committee Gets Quick Action

LIMA, OHIO.—"Better Sidewalks" activity generally consists of propaganda, but in the past two months the Better Sidewalks Committee of the Lima Chamber of Commerce has developed a complete sales campaign out of its job. A report was filed with the Directors the middle of May showing that over two miles of new walks have been laid. Contractors tell the committee that approximately ten miles of walks are under contract to be put down this summer.

As the business policy of the committee has developed, building material companies have placed members of their selling staffs at the disposal of the committee for reasonable service each week.

Starting with a long list, dating back over a year, of property owners that the city had notified to build walks, the committee demonstrated that immediate action would save the owner from 5 to 7 cents a square yard in construction costs, as the city had set a figure of 35 cents for doing the work, and sidewalk contractors gave the committee prices ranging from 27 to 30 cents. Personal calls were made on the

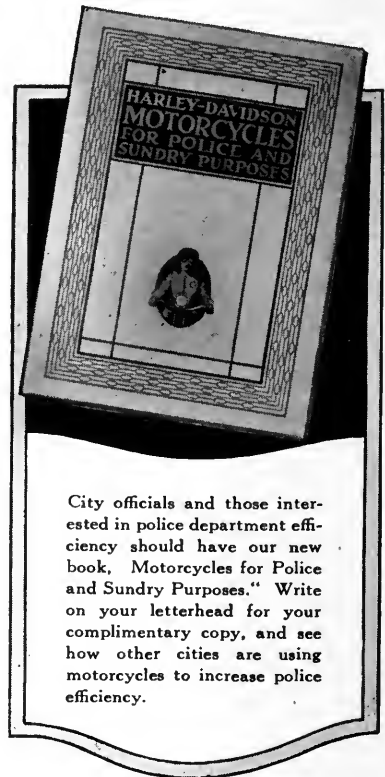


Kansas City Police Get 23 More Harley-Davidsons

The first 17 Harley-Davidsons on the Kansas City, Mo., police force proved so successful that 40 are now in use there.

Chief of Police Edwards is enthusiastic about the efficiency and economy of "riding down crime with motorcycles." In one district, 19 policemen with motorcycles are doing the work which formerly required 30 patrolmen.

Kansas City's Harley-Davidsons are used on regular beats, for chasing speeders, in regulating traffic, enforcing parking rules, for hurry-up calls in the detective department, and for chasing "motorized crooks."



City officials and those interested in police department efficiency should have our new book, *Motorcycles for Police and Sundry Purposes*. Write on your letterhead for your complimentary copy, and see how other cities are using motorcycles to increase police efficiency.

Hundreds of American cities endorse the Harley-Davidson for police and other municipal service. Ask your local dealer for demonstration, or write to us for special literature on police use of motorcycles.

HARLEY-DAVIDSON MOTOR COMPANY
MILWAUKEE WISCONSIN

Harley-Davidson

World's Champion Motorcycle

property owners, and when the least inclination was shown to rebuild the walks, contractors were immediately sent after the jobs.

Pledge cards to show the condition the owner believed his walk to be in, and an "I will put it in good condition," were placed before the members of the Rotary, Kiwanis and Lions luncheon clubs, with speakers to sell the campaign. Over three hundred members of the three clubs stood on their feet and endorsed the drive. A sample of the results was shown when four Rotarians called the chairman of the committee, within twenty-four hours after his talk before them, to find out where they could get a contractor *at once*.

Dividing the committee into four squads and assisted by salesmen of the building supply concerns selling the idea and not their goods or their firm, the campaign has now centered down to a house-to-house visitation in the four sections off the city square, the drive concentrating on the central properties in the city first, but eventually to reach the outlying districts. The first effort of the committee was to get everyone of the 1,349 members of the Chamber to repair his sidewalk before the broader campaign opened.

J. KENNARD JOHNSON,
Manager, Lima Chamber of Commerce.

Volunteers Report Traffic Violations

SPOKANE, WASH.—Renewed effort is being made in Spokane by the Chamber of Commerce to reduce to a minimum the amount of careless and reckless driving of automobiles through the city, by the organization of a so-called Citizens' Vigilance Traffic Committee. There are now over 400 people on the committee, who have pledged themselves to report to the Police Department all violations of the traffic ordinances that come to their attention.

The members are furnished with cards upon which to fill in the place, nature and time of the occurrence, and the license number of the automobile. A number is given to each member which is known only to the secretary of the committee and to the Police

Members No. Date Time ... A. M.
Exact Location Ave. and Street
License No. Year
(Place X opposite proper heading)

- 1—Fail to give Right of Way at street intersection.
- 2—Approached pedestrian or vehicle crossing ahead without slowing up.
- 3—Pass another vehicle or street car at intersection.
- 4—Passing standing car while loading or unloading passengers.
- 5—Emerged from alley (without warning) (faster than five miles an hour).
- 6—Passed vehicle to right.
- 7—Projecting load not protected by light or flag.
- 8—Cut corner.
- 9—Drive on wrong side of street.
- 10—Turn in middle of block.
- 11—Failed to signal change in direction, change of speed or stop.
- 12—Parking on Illinois Avenue.
- 13—Obstruct traffic.
- 14—Muffler open.
- 15—Car running without lights—front, rear.
- 16—Reckless driving. (Give details.)
- 17—Vehicle does not display license plate as required by law.
- 18—Vehicle did not stop after accident and render assistance.
- 19—Party under legal age operating motor vehicle.

Write in details or other violations.

Owner's } Name
Driver's } Name

Address

.....

Department. This enables him to make his entry quickly while at the wheel of his own machine. When an accident occurs or the case is brought to trial, the name of the complaining committeeman is disclosed, as he is often called upon to testify. The card contains a list of the more common traffic violations for the guidance of the vigilants.

This movement was launched by the Fire and Accident Prevention Committee of the Chamber of Commerce, and has proved a great success. The Police Department is coöperating with the Citizens' Vigilance Traffic Committee by issuing a warning to all first offenders, and by dealing more drastically with repeated offenders. The value of the plan consists chiefly in educating the public and the automobile drivers to the dangers of disregarding the traffic laws, which are formulated for the obvious purpose of preventing accidents.

ALAN G. PAINE,
Office Manager, Spokane Chamber of Commerce.

FOX ROTARY SNOW BROOM

"ENDORSED BY EXPERTS"

GARWOOD FERGUSON

COUNTY ENGINEER OF PASSAIC COUNTY

PATERSON, N. J.

TELEPHONE

NO. 8503 LAMBERT

Mr. T. J. Wabser,
State Highway Engineer,
Broad St. Bank Bldg.,
Trenton, N. J.

Dear Mr. Wabser:

As per your recent conversation with Mr. W. G. Fox, of Newark, in regard to testing out his Rotary Broom Snow Remover, I beg to advise that I witnessed the demonstration of this machine yesterday in the Cities of Passaic and Clifton and believe it to be the best type of apparatus for cleaning snow for highway work that I have ever seen. The idea of removing snow by means of a rotary broom is not a new one, the Street Railway Companies throughout the United States having adopted this method for several years past, but to my mind the success of this particular piece of apparatus lies in the fact of its wonderful tractive power.

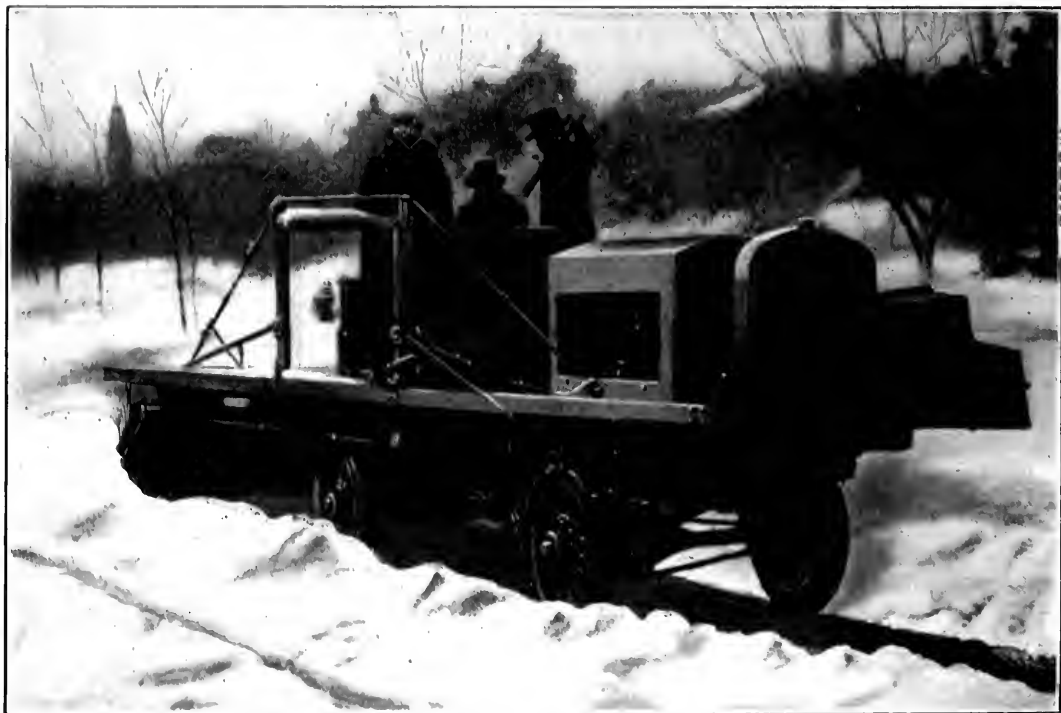
The Rotary Broom is mounted in front of an F. W. D. Truck which has sufficient traction on each of its four wheels to drive it through almost any size drift. The Broom is driven independently by means of a powerful auxiliary engine mounted on the rear end of the truck giving the broom a speed of 350 revolutions a minute. It is claimed that the brooms will give at least forty-eight hours' continuous service. The particular one we saw had been in use in Kearny and Newark for the last couple of days and had only lost about two inches of the broom.

I believe that in cleaning snows of from eight to twelve inches in depth there should be no difficulty in cleaning from fifty to seventy-five miles a day.

The fact that the Public Service Company has adopted this type of snow remover with such good results should be sufficient evidence to demonstrate its worth on the removal of snow from public highways.

Yours truly

(Signed) **GARWOOD FERGUSON**
County Engineer



WRITE FOR DETAILED PARTICULARS

FOX ROTARY SNOW BROOM,

**9-11-13 LOMBARDY STREET,
NEWARK, N. J.**

"Brighten the Corner Where You Are"

The Clean-Up Program Should Run Through the Whole Year

By Allen W. Clark

Chairman, National "Clean Up and Paint Up" Campaign Bureau, St. Louis, Mo.

THE campaign conducted by the National Clean Up and Paint Up Campaign Bureau, established since May, 1912, touches the constituency of THE AMERICAN CITY more closely than any other classes, for everywhere the leaders in its thousands of local campaigns are the officers, especially the secretaries, of the chambers of commerce, the mayors or the city managers, and the street, health, fire and police departments.

But most, or first of all, does the campaign interest the secretary of the chamber of commerce, because of its appeal to all the many classes and interests which he and his organization represent in their association together for effective community service and leadership. A chamber of commerce that once has led all these various elements of the people to unite in achieving such constructive and permanent results in the public welfare is on solid ground for all its other undertakings. That fact perhaps explains why the chamber that once establishes a Clean Up and Paint Up Campaign in its annual program seldom abandons it, but regularly renews the campaign every spring—and some of them every spring and fall—thus confirming and adopting for its own the Denver verdict, stated in the annual report of that chamber, after its third annual campaign in 1914: "Clean Up and Paint Up has become a permanent field of profitable effort for the Denver Chamber of Commerce." This decision has been approved by every succeeding administration, and the 1921 campaign in Denver was in charge of the Chamber's Real Estate Bureau.


Indeed, in most of these campaigns the chamber of commerce secretary is the impelling and guiding force that enlists the interest of the various essential factors, brings them together, and counsels the organization, program and direction of the work, even though he and the chamber frequently keep in the background while an

affiliated organization "conducts" the campaign.

Itself a straightforward and self-respecting alliance of enlightened self-interest and public service, the campaign makes that self-same appeal to every class. Its proposal to each class, or official, to each man or woman whose coöperation is sought, is to help him or her in the special job in which he or she is most interested. The thousands of friends and supporters it has secured and held by this appeal through all the years of its activities would make a quite representative if not complete roster of the men and women nationally prominent in all the practical efforts for community improvement, in sanitation and beautification, and in the conservation of life and health, and of property, against the ravages of disease, fire and deterioration.

This campaign appeals to the mayor because it is he who feels the most pride—or shame—in the appearance of his city when he presents "the key of the city" to visiting conventions. He knows, too, that he and his administration are expected to reflect the character, the soul of the city, and that since the women have become citizens in reality and power, the city's soul has been enlarged and awakened, and that, first of all in this new order of things, slatternliness in municipal house-keeping will be tolerated no longer.

Moreover, the mayor who has been on the job long enough to be familiar with it has perhaps grown tired and ashamed of the boasted tonnage or cubic yards of dirt and rubbish hauled during an ordinary "Clean Up Week"—as any housewife would be ashamed to make a similar confession of her own house cleaning!—and such mayors and their lieutenants in the street, health, fire and police departments see in the Clean Up and Paint Up campaign the means and the methods whereby the necessary house cleaning in spring and fall shall be made a less arduous task, through the simple expedient of keeping clean, day by day.



WHEN BETTER CULVERTS
ARE MADE
**THE NEWPORT
CULVERT CO.**
WILL MAKE THEM

**DRAINAGE
CULVERTS**
that **ENDURE**
are
ESSENTIAL

NEWPORT CORRUGATED METAL CULVERTS

Are made of pure ingot iron which by actual laboratory tests has been shown to be the most rust-resisting for this purpose. Newport culverts are made in round and half-round forms to cover all conditions for which culverts may be used.

The proper drainage of the territory on the high side of a road makes it necessary that water be readily removed by a culvert that is permanent, not one which rusts or may be cracked by the first heavy load passing over the road. Newport Culverts resist the load, do not rust and serve faithfully year after year with no maintenance costs.

Send for our literature describing the special features of Newport Culverts.

NEWPORT CULVERT CO.
NEWPORT 542 West 10th Street **KENTUCKY**

The City's Legal Rights and Duties

Information for City Attorneys and Other Municipal Officers, Summarizing
Important Court Decisions and Legislation

Conducted by A. L. H. Street, Attorney at Law

City Ordinance Forbidding Members of Fire Department to Become Members of Unapproved Labor Union, Upheld

The city of Dallas adopted an ordinance forbidding members of its fire department to become members of an association not approved by the chief of the fire department and the fire commissioner, and requiring withdrawal from membership in any organization deemed by such officials to be "detrimental to the duties and service required to be performed by the members of the fire department," etc.

Certain firemen of the city refused to withdraw from a local union affiliated with the American Federation of Labor, asserting their right to organize for mutual protection in their work. They were thereupon discharged, after a hearing on charges of violation of the ordinance above mentioned, and sued to require their reinstatement.

The decision announced by the Texas Court of Civil Appeals in the case of McNatt vs. Lawther, 223 Southwestern Reporter, 503, sustains the action of the municipal authorities. The Court says:

"The Board of Commissioners of the city of Dallas had the interest of the public, as well as the employes of the city, to consider. . . .

The commissioners may have taken into consideration the effect of the increased probability of strikes by the policemen or firemen of the city, as a body, if such employes were permitted to become members of an organization which might bind them to act as a body in such matters. The dire consequences of such a strike have been exemplified in the comparatively recent strike of the policemen of the city of Boston. The adoption of the ordinance referred to, or similar rules and regulations, may have been the result of a purpose to minimize, as far as possible, the probability of some calamity in the city of Dallas. We are not called upon to express an opinion as to whether such rules were wise or not. We do conclude, however, that we cannot say that the adoption and enforcement thereof by the constituted authorities of the city was arbitrary or capricious."

Plaintiffs relied on a provision of the Dallas charter and a section of the Texas statutes as entitling them to retain their positions. The charter provision is to the effect that all policemen and firemen shall hold their positions during good behavior and shall only be removed for causes rendering them unfit, in the opinion of the city commissioners, to remain in the service, and after hearing of charges against them. The statute guarantees the right of "all persons engaged in any kind of work or labor" to form trade unions.

As to the charter provision, the Court holds that because there might be divergent views as to the propriety of refusing city employes permission to organize themselves, the courts could not interfere.

As to the statute, the opinion says:

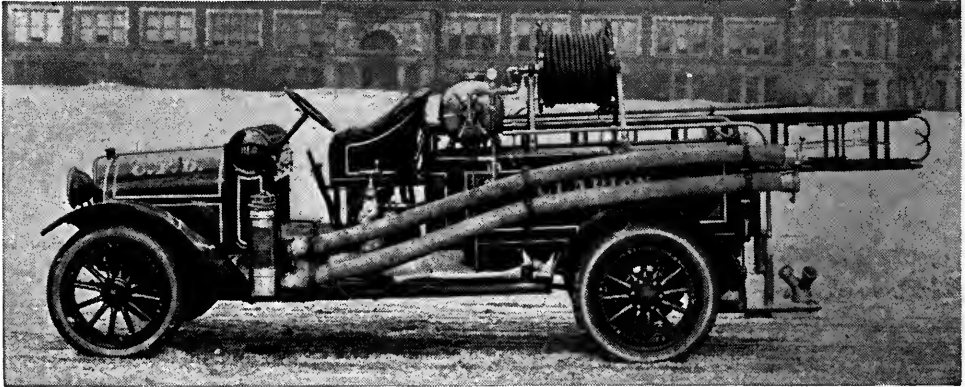
"It was probably the purpose of this legislation to make it clear that the early English decisions, which held labor unions under certain circumstances to be unlawful, and our own laws against trusts and combinations in restraint of trade, did not apply to labor unions. But, on the other hand, it did not seek to regulate the attitude of the employer toward the organization of unions among his employes, and we take it that, if the employer should see fit to prohibit his employes from becoming members of such 'trade unions' on pain of discharge in case of violation of such prohibition, such act would not be in violation of this law.

"If the act had sought to impose any restrictions upon the freedom of the employer in such matter, it would probably be held unconstitutional."

In the somewhat similar case of San Antonio Fire Fighters' Local Union vs. Bell, 223 Southwestern Reporter, 506, another branch of the same court upheld the right of the governing authorities of San Antonio to discourage formation of unions among the city's firemen. In that case it was said:

"The general rule is that, in the absence of a contract, the employer has the authority to discharge an employe with or without reason, and the only change made in that rule, so far

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as the city of San Antonio is concerned, is that charges must be preferred in writing, and the trial must be public on these charges. It must be inferred that the Legislature intended that the charges must not be frivolous or trivial, for such charges would be fraudulent. It must be presumed that, before any of appellant's members are removed or discharged, proper charges in writing will be filed and a just trial had thereunder. . . .

"It cannot be said, as a matter of law, that a municipal corporation has no right or authority, as must be the claim of appellant, if there is any basis for this suit, to determine that membership in a certain organization renders its appointees inefficient or untrustworthy, and, even without admission on the part of one of the affiants that he owed a higher duty to his union than his city in case of orders for a strike upon the part of the firemen, it cannot be assumed that a fair trial will not be given the members of the union. To make such assumption and grant an injunction to prevent the commissioners of the city from performing their functions under the charter, granted by the Legislature of Texas, and transfer the trial of officers or employees to the district court, would be a usurpation of power which cannot be consistently sanctioned in a democratic government. . . .

"The right of a municipal corporation is the same in regard to its employees as is that of an individual or private corporation, and in the case of the charter of San Antonio there is no attempt to destroy that right, but merely to prescribe the method in which it must be exercised. The charter has merely said that the right to employ and discharge or remove remains, but the removal cannot be made in two years unless charges are preferred in writing and a public hearing given thereon.

"The exercise of the power of the removal of an officer or employee is essentially administrative or executive. The San Antonio commissioners do not constitute a court, but are an administrative body, and the power to remove officers is administrative power, to be used for the purpose of maintaining discipline and good order in the management of the business of the city."

Railroad May Be Required to Keep in Repair Roadway of Bridge Over Its Tracks

The Minnesota Supreme Court recognizes the right of a city to require a railroad company to bear the expense of repaving the surface of a bridge constructed by the company over its tracks. (*City of St. Paul vs. Great Northern Railway Company*, 177 Northwestern Reporter, 492.)

Many years ago the defendant railway company bridged its tracks at their intersection with Rice Street in St. Paul. The bridge was paved. The paving on both the

street and the bridge became so out of repair that in 1917 it was necessary to repave. That the safety and convenience of the public required repaving was conceded. The defendant refused to repave, claiming that its duty was discharged when it built the bridge and maintained a sufficient structure to sustain a surface for travel. The city repaved the bridge when it repaved Rice Street, and sued the railroad company for \$1,938.30, the cost, for which it had judgment.

Affirming this judgment, the Court says, in part:

"The sole question is whether a railroad company, which in the exercise of the police power is compelled without compensation to bridge its tracks, is required, when the pavement of the bridge becomes so worn that it must be replaced, to replace it without compensation.

"The question has not been directly set at rest by a decision of this court. The court seems often to have assumed the law to be that the uncompensated duty rests upon the railroad to keep its bridge, made necessary by its disturbance of the safe use of the street for travel, continuously in fit condition for public use, and often the railroads seem to have acquiesced; and expressions to the effect that it is the duty of the railroad company to maintain the highway in a fit condition for travel, that a bridge is a safety device which in a proper case must be constructed and maintained by the railroad, that the railroad must restore the highway which it disturbs to its former condition of usefulness, and that its duty is a continuing one, are frequent in the cases. . . .

"The duty of the railroad comes from an exercise of the police power. It is not at an end when it constructs a bridge sufficient at the time to bear public travel. It must rebuild worn-out structures. . . . It must respond to an increased public need. *City of St. Paul v. Great N. R. Co.*, 138 Minn. 25, 163 N. W. 788, L. R. A. 1917F, 485. There we held that the railroad might be compelled to strengthen its bridge so as to carry street railway traffic though such traffic was not on the street when the bridge was built. . . .

"The railroad's interference with safe public travel is continuous, and the obligation of the railroad to conserve the safety and convenience of the public, imposed under the police power, is as continuous as its interference with safe public travel. The required structure must be sufficient to sustain public travel, and the railroad must furnish a fit surface upon which public travel may pass. Its obligation to repave is as definite as its duty to bridge. It is not enough that it furnish a structure physically sufficient to support a roadway. It must furnish the roadway. When worn out it must replace it."



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The "Caterpillar's" usefulness is not limited to snow removal. For building and maintaining roads, working on farm or ranch, in the mining, oil and lumber industries — wherever power and endurance are at a premium—the "Caterpillar"* has no real competitor.*

A blizzard rode into New York on a fifty-mile gale one night last February, and buried the city under more than a foot of snow. Had New York been unprepared traffic would have been paralyzed and the lives of thousands threatened by fire. *But New York was ready.* Against just such emergency, city officials had authorized the purchase of fifty Holt "Caterpillar"* Tractors. Early next morning the "Caterpillars"*, pushing 10-ft. snow plows, battered through the drifts which choked lower Broadway, Fifth Avenue, and the approaches to bridges and ferries. Later they cleared the residential districts. The cost of the "Caterpillars"* was returned many times over by the business losses they prevented. What the "Caterpillar"* did for New York it will do for any other city. Let us arrange to show our motion pictures of the "Caterpillars"* bucking New York's snow. Write or wire for further information.

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COLLECTION AND DISPOSAL OF MUNICIPAL REFUSE

Rudolph Hering, Consulting Engineer, New York City, and Samuel A. Greeley, Consulting Engineer, Chicago, Ill. McGraw-Hill Book Company, Inc., New York City. 1921. XII + 653 pages. Illustrated. \$7.00 postpaid.

When one considers that before the publication of this book there was practically no up-to-date, reliable and authoritative publication on this most important subject of municipal concern, some idea of the welcome it will receive from sanitary engineers and municipal officials may be appreciated. The authors have placed at the disposal of the reader the work and study of their professional careers and have brought into the printed page much material which has never before been as readily available. The subject is treated in a thorough and logical manner, beginning with a classification and definition of the various refuse materials for treatment at the house, hotel or other point of origin, carefully considering the details of collection methods and equipment, transportation with cost, and the methods of disposal. The closing chapters, after the discussion of garbage, deal with street refuse, night-soil and dead animals, and a careful delineation of the problem as applied to small towns and villages. No municipal, technical or civic library, engineer or municipal official dealing with this important subject can afford to be without this volume, covering completely a subject which began to receive careful, scientific study only two decades ago.

HIGHWAY ENGINEERING—RURAL ROADS AND PAVEMENTS

George R. Chatburn, Professor of Applied Mechanics and Lecturer on Highway Engineering, University of Nebraska. John Wiley & Sons, Inc., New York City. 1921. XII + 379 pp. Illustrations, diagrams and tables. \$3.00.

A new book, covering the most recent and the best practice in the construction of rural roads. Special attention is given to detail construction of those types of roads most common in the rural and country districts, small cities and towns. The book is particularly adapted for study by the layman or official who is not a trained engineer.

THE STORY OF ENGLISH PUBLIC HEALTH

Sir Malcolm Morris, K.C.V.O., Fellow of the Royal Sanitary Institute. Funk & Wagnalls Company, New York City. 1921. XI + 166 pp. \$1.50.

An interesting historical sketch of the evolution of the public health system of England and Wales. The preparation of this book by Sir Malcolm Morris was caused by the increased interest in the subject of public health following the creation of the Ministry of Health in England. The book is entirely historical in character and should prove of interest and inspiration to public officials, particularly those intimately connected with health matters.

The publications listed above are for sale by their publishers or through the Book Department of THE AMERICAN CITY. Those listed below are understood to be free upon application.

RECREATION

"Playgrounds and More Playgrounds—How to Get Them," by Harrison Gray Otis. 8 pp. Illustrated. An account of practical methods employed to increase interest in playground developments, published as No. 197 of The American City Pamphlets, by The Civic Press, Tribune Building, New York, N. Y. (Apply to publishers.)

MUNICIPAL WASTES

"Municipal Wastes, Their Character, Collection and Disposal," by H. R. Crohurst, Associate Sanitary Engineer, U. S. Public Health Service. Published as Public Health Bulletin No. 107. 98 pp. Illustrated. 1920. Thorough consideration of the subjects, with special emphasis on disposal, including methods and costs. (Apply to U. S. Public Health Service, Washington, D. C.)

BRICK PAVING

"Economy in Construction and Maintenance of Brick Streets and Highways," by Will P. Blair, Vice-President of the National Paving Brick Manufacturers Association. 15 pp. Illustrated. 1921. "The Significance of Local Conditions in the Design of Brick Pavements," by Maurice B. Greenough, Secretary of the National Paving Brick Manufacturers' Association. 14 pp. Illustrated. 1921. Papers presented before the Indiana Engineering Society. (Apply to Maurice B. Greenough, Secretary, National Paving Brick Manufacturers' Association, Engineers' Building, Cleveland, Ohio.)

SCHOOL LUNCHROOMS AND DOMESTIC SCIENCE

Two pamphlets, published by Albert Pick & Company, 208-224 West Randolph Street, Chicago, Ill.: "Feeding the School Child," a discussion of school cafeterias and lunchrooms, with special emphasis on the home economics lunchroom in city and community schools; and "Practical Domestic Science in City and Country Schools," with many valuable suggestions on the teaching of this subject. (Apply to publishers.)

POLICEWOMEN

"Tentative Digest of the Work of Policewomen in the United States and Foreign Cities," compiled by the International Association of Policewomen. 51 pp. 1921. This pamphlet contains the answers to a questionnaire on such subjects as numbers employed, uniforms, salaries, powers, etc. (Apply to G. S. Davis, Women's Division, Police Department, 12 and Grand River Avenue, Detroit, Mich.)

Baltimore, Md.—Twenty-sixth Annual Report of the Free Public Bath Commission for the fiscal year ended December 31, 1920. (Apply to Robert F. G. Kelley, Secretary and Superintendent, Baltimore, Md.)

Brantford, Ont.—Financial Statement of the Municipal Corporation for the year ending December 31, 1920. (Apply to H. F. Leonard, City Clerk.)

Dallas, Tex.—Progress Report, March, 1921, including Da summary of Dallas Public Health Activities for 1919 and 1920, by Leslie C. Frank, U.S.P.H.S., Director of Public Health, Dallas. Report of the United States Public Health Service Cooperating with the Dallas Public Health Administration. (Apply to author.)

Dunkirk, N. Y.—The proposed Hydro-Electric and Water Supply Development from Canadaway Creek for the City of Dunkirk, N. Y. Presented by the Board of Water Commissioners. (Apply to James P. Morrissey, Board of Water Commissioners, Dunkirk, N. Y.)

Easton, Pa.—Thirty-fourth Annual Report, including the Mayor's Message, Controller's Report, and Department Reports, for the fiscal year 1920. (Apply to Hon. S. S. Horn, Mayor.)

Greenwood, S. C.—Annual Reports of the Greenwood Town Council and the Greenwood Water and Electric Light Plant, for the year 1920. (Apply to R. J. Cartledge, Jr., Clerk and Treasurer.)

Jackson, Miss.—Quarterly Financial Statements for the periods from October 1, 1920, to December 31, 1920, and from January 1, 1921, to March 31, 1921. (Apply to A. W. Tobias, City Auditor.)

Ogden City, Utah.—Annual Report of the Auditor for year 1920. (Apply to A. F. Larson, City Auditor, Ogden City, Utah.)

Rockford, Ill.—Eleventh Annual Report of the Board of Commissioners of the Rockford Park District, covering the period January 1, 1920, to December 31, 1920. (Apply to Levin Faust, President, Rockford Park District Commission, Rockford, Ill.)

Springfield, Mass.—Forty-seventh Annual Report of the Board of Water Commissioners, together with the reports of the Water Registrar, Superintendent and Chief Engineer. For the year 1920. (Apply to Alfred R. Hathaway, Water Registrar and Clerk of Board, Springfield, Mass.)



Cletrac Works all the Year 'Round

MANY cities are profiting by the year 'round usefulness of Cletrac. It plugs right along on hot or cold days alike and cleans up a wide variety of road jobs with speed and economy.

In the summer when horses and mules are slowed by heat, dust and flies, Cletrac pulls the sweeper at a fast, even gait all day long. Two broad tank-type tracks enable Cletrac to speed the plowing of old pavements, and to walk easily

over the soft ground in building new pavements.

Other typical Cletrac jobs are hauling material, running the concrete mixer and pumps, and in winter keeping the streets clear of snow.

The Cletrac dealer near you will gladly show you how Cletrac will take over your road jobs at a substantial saving in time and labor. Write to us for his name and interesting booklets.

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Trackless Trolley Demonstrates Practical Economies

OVER one hundred well-known street railway officials and engineers witnessed a successful demonstration of the trackless trolley bus at Schenectady, N. Y., on June 15. A half-mile of double wire overhead was erected for the tests, and the visitors spent the day examining the car and riding over the route.

The trackless trolley bus resembles in general appearance the present safety car and seats 30 passengers. Its speed is about 20 miles per hour. The electrical equipment consists of one G.E. railway motor and a K type controller arranged for foot operation and dead-man's control. Protective apparatus includes a circuit breaker on the positive side and a fuse on the negative.

Two overhead wires on 14-inch centers supply the current, at 600 volts, taken into the car by a sliding type collector, maneuvered by the motorman from his seat by means of a lever which disengages the collector from the overhead and allows a leeway of 18 feet—9 feet on each side—for passing other vehicles. This arrangement allows two cars to operate in opposite directions on the same wire. The bus demonstrated at Schenectady was built by the Atlas Truck Corporation, York, Pa.

The following statement and figures were prepared by the engineers of the General Electric Company:

"Where new routes or extensions to existing routes are required, it is desirable that careful consideration be given to railless transportation to be provided either by trolley busses or gasoline busses.

"The relative operating costs per mile of the trolley bus and the gasoline bus are approximately as follows:

	Cents Per Trolley Bus	Bus Mile, Gasoline Bus
Maintenance of way and structure	0.5	0.5
Maintenance of equipment....	4.0	9.5
Power	2.1	4.99
Platform	7.05	7.05
General expense	2.4	2.4
Depreciation	1.9	3.43
Total	17.95	27.87

"The maintenance of equipment, general expense and depreciation of the trolley bus are based on known costs of the standard safety car, while the platform and power costs are calculated on the basis of 60 cents per man hour, 8.5 m. p. h. schedule and 1.5 cents per

kw. hr. for power. The costs for the gasoline bus are the average of seven companies operating this type of vehicle in city service.

"The saving in operating cost is about 10 cents per bus mile in favor of the trolley bus. Assuming 33,000 miles per year per bus, this

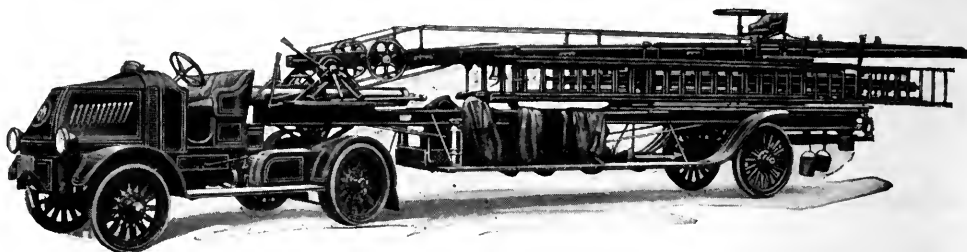


THE TRACKLESS TROLLEY TURNS FREELY TO AVOID TRAFFIC

is equivalent to an annual saving in operating cost of \$3,300 per bus in service.

"The first cost of a trolley bus installation is higher, due to the overhead construction required for the operation. This will cost about \$4,500 per mile of single set of wires, and \$5,500 per mile of double set of wires, based on wooden poles and cross-span construction. Fixed charges covering interest, depreciation and taxes on the investment on overhead line will not exceed 15 per cent; however, the total costs of operation, including these fixed charges, will be materially lower than that of the gasoline bus.

"A 5-mile route can be operated with trolley busses on a 15-mile headway at a total cost, including fixed charges, of \$40,000 per year. To give the same service with gasoline busses would cost \$52,000 per year. With 10-minute service, the saving by use of trolley busses would be \$17,500, and on shorter headways still greater."



Dependable—Always

ABSOLUTE dependability is the foremost consideration in the purchase of fire-fighting apparatus.

The Mack four wheel Tractor-drawn Aerial Ladder Truck has won the approval of the New York Fire Department to such an extent that they recently placed their order for ten pieces.

This makes a total of 136 pieces of Mack Fire Apparatus in service and on order for the City of New York.

Write today for our pamphlet containing detailed specifications of Mack Standard Type AC-7 Fire Apparatus. Address Room 45.

INTERNATIONAL MOTOR CO.
25 Broadway New York

TWO MODELS—AB—AC—
28 TYPES



PERFORMANCE COUNTS

Methods, Materials and Appliances

News for Boards of Public Works, Engineers, Contractors, Purchasing Agents, and Others Interested in the Economical Construction and Efficient Operation of Public Improvement Undertakings

A Road-Building Tractor

To take care of the demands of the road-building industry for a heavy service tractor, the Yuba Manufacturing Company, 433 California Street, San Francisco, Calif., has developed a machine especially built for road building and maintenance. This Yuba road builder is a 25-40 machine, the grouser plates of which are of cast steel with a flat area in contact with the road, about 16 square inches for each tread. These treads are particularly resistant to wear and are so designed that they cannot mar the finest pavement. The entire width of the front wheel rests squarely on the road. The seat for the operator is of the artillery type, 14 inches wide and 6 feet long, mounted on two sets of leaf springs and fitted with a stuffed cushion. This provides for two persons besides the driver, or enables the driver to shift from side to side to watch the road or stakes ahead.

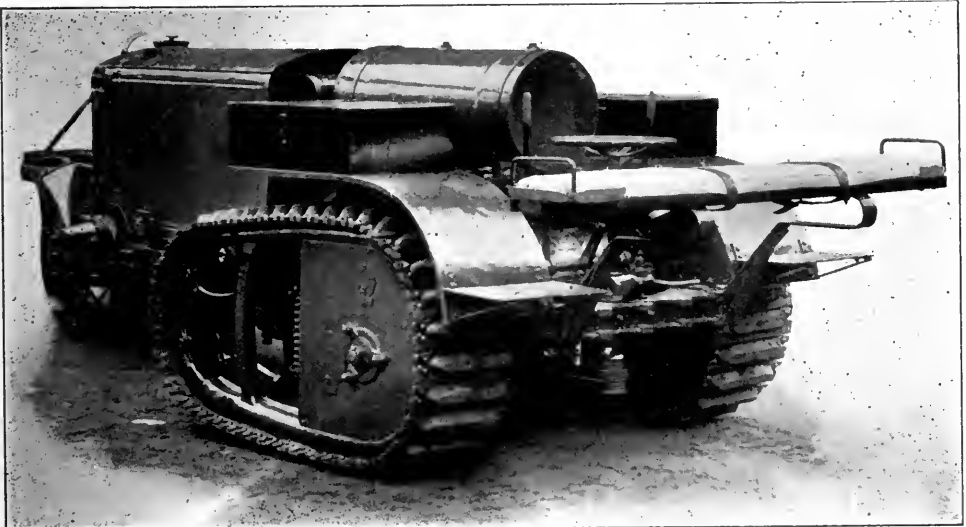
The treads are covered with wide, heavy fenders to protect the driver from dust and dirt, affording protection from accidental contact with moving treads, and support for the tool boxes. The Yuba tractor is particularly well known in the West, having first proved its worth in the agricultural field and then in the road-building field. In a test of a Yuba tractor pulling a grader between Dallas and Fort

Worth, Texas, the dynamometer showed a starting pull of 6,100 pounds and between 5,000 and 5,500 pounds under steady operation. The outfit turns readily as sharply as the grader and can swing in its own length.

Maximum Demand Controllers for Pipe Lines

Some water-supply systems are required to furnish an adequate minimum pressure for fire protection, and if they also have one or more large consumers whose demands are so great as to nearly equal the pipe line capacity, the pressure available for other purposes may be reduced seriously. Such a condition may occur on a gravity line with a large consumer at the far end from the source and with one or more intermediate communities having only a slight draft on the line. The pipe line can furnish the amount needed by the large consumer without affecting the pressure of intermediate communities if the large quantity of water be delivered at a reasonable rate. For this purpose a maximum demand rate of flow controller has been developed by the Simplex Valve and Meter Company, 5722 Race Street, Philadelphia, Pa. This controller prevents the drop in pressure due to excess peak demands on the water-supply line.

The hydraulic gradient without the rate con-



A TYPE OF TRACTOR RECENTLY DEVELOPED IN CALIFORNIA FOR ROAD BUILDING

THE AMERICAN CITY.

You cannot get a truck that is better suited to your business than a Federal

There is a capacity built to fit your needs—a body made to meet your requirements

Federal engineers know the needs of business—and build Federal trucks to efficiently and economically fit them

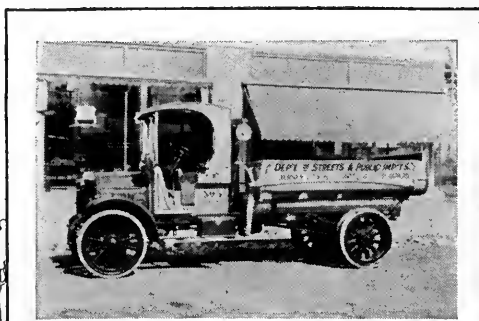
Another

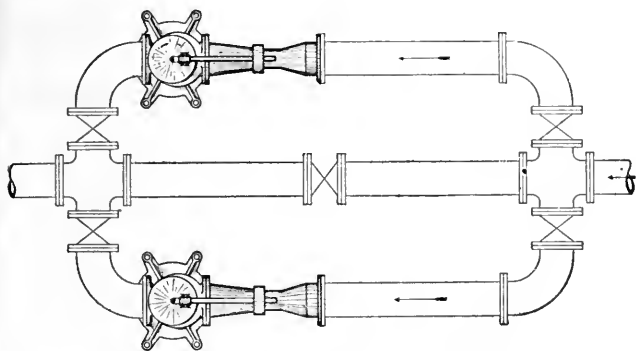
FEDERAL

One to Seven Ton Capacities

MUNICIPAL officials are conservative purchasers. They buy only the best—tested and proved through the years. Their preference for Federal is due to its known value—its sterling record of performance during the 11 years of its manufacture. This is one of nine Federals in the various city departments of Jersey City, N. J.

FEDERAL MOTOR TRUCK CO.
34 FEDERAL AVE. DETROIT, MICH.





SIMPLEX METERS SET IN PARALLEL

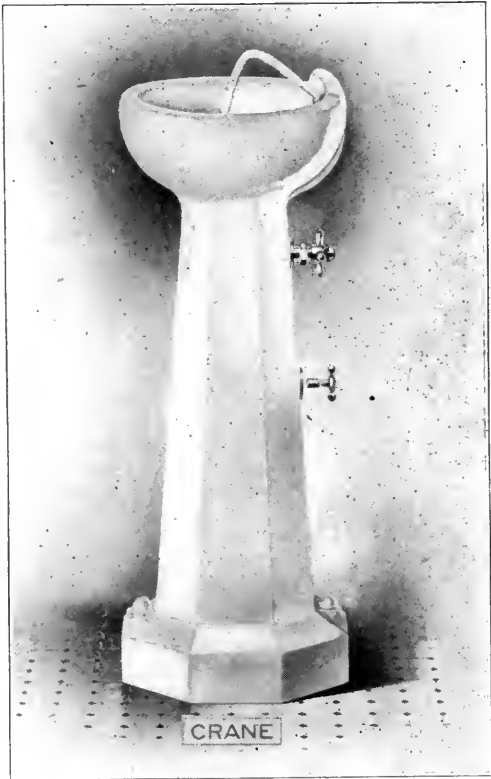
troller is far below the lowest hydraulic gradient when the controller is installed. The maximum demand controller remains open at the predetermined setting until the rate of flow reaches the prescribed maximum. From this point on, the opening of the controller is just sufficient to permit the specified rate of flow, and no more, to take place. A typical arrangement for installing a controller is shown in the accompanying illustration. The controller can be by-passed in case of emergency and the line permitted to deliver its full capacity. The apparatus may also be installed in parallel, each one covering half the full amount of flow. Either of the two controllers, however, may be used separately to supply the demand.

The principle of operation of the maximum demand controller is briefly as follows: It consists of a Venturi tube with the discharge flange connected to a valve body provided with a double-disc type balance valve. The valve stem, guided in the upper and lower covers, engages a diaphragm near the bottom of the valve body and at the top is attached through a flexible connection to the short arm of a lever or scale beam. For any given rate of flow there exists a certain difference between the water pressure in the valve body and that in the throat of the Venturi tube, due to the difference between velocities at these points. The downward pressure on top of the diaphragm is greater than the upward pressure below, and for this reason there is transmitted to the short arm of the scale beam a downward pull that is balanced by the counterweight on the longer arm of the scale beam. This balance of the counter-weight and the diaphragm loads limits the maximum rate of discharge through the controller. This fact is obvious, since, if the rate of flow should momentarily increase beyond the allowable maximum, the diaphragm load would also increase, thus diminishing the valve opening until the balance is automatically restored. Altering the position of the counter-weight on the longer beam arm changes the maximum permissible rate of flow.

Drinking Fountains for Municipal Buildings

A distinctive type of sanitary drinking fountain, known as the Tyrone, is manufactured by the Crane Company, 836 South Michigan Avenue, Chicago, Ill. This angle-stream drinking fountain, mounted on a heavy vitreous pedestal, has a 14-inch diameter bowl with an angle bubbler protected by a cowl, both of which are integral parts of the pedestal. The supply and waste connections are of cast brass with an iron supply pipe to the floor. All of the exposed metal parts, including

the operating valves, are of nickel-plated brass. The height of the fountain to the top of the pedestal is 30 or 36 inches, the bowl is 4½ inches deep, and the pedestal itself is 14 inches wide across the octagonal base.



A CLEANLY AND ATTRACTIVE DRINKING FOUNTAIN WITH HEAVY VITREOUS PEDESTAL AND 14-INCH-DIAMETER BOWL CONTAINING ANGLE BUBBLER

THE AMERICAN CITY



Partial view of the famous asphalt lake on the Island of Trinidad.



All good streets lead from Trinidad

Wherever the art of modern street building is practiced, the finest streets and highways are surfaced with Trinidad Lake Asphalt—the standard paving material of the world.

Trinidad Lake Asphalt combines beauty and permanency to a higher degree than any other bituminous paving material known. It is resilient, noiseless, easily repaired and holds the record for low maintenance.

Trinidad Lake Asphalt is a native bitumen—a product created by nature and storm-beaten and sun-cured in the tropics for ages. Neither torrid heat nor arctic cold affect its binding and wear-resisting properties.

More than four million tons of this remarkable material have been used in street and road building since 1879—enough to surface a roadway, eighteen feet wide, extending around the entire world.

Trinidad Lake Asphalt is the foundation for numerous asphaltic protective products now included in the famous Genasco Line. Detailed information regarding any of these will be sent on request.

Before paving new streets or repaving old ones, write for "The Asphalt Time-Table."

THE BARBER ASPHALT PAVING COMPANY

New York
Pittsburgh

PHILADELPHIA
St. Louis
Kansas City

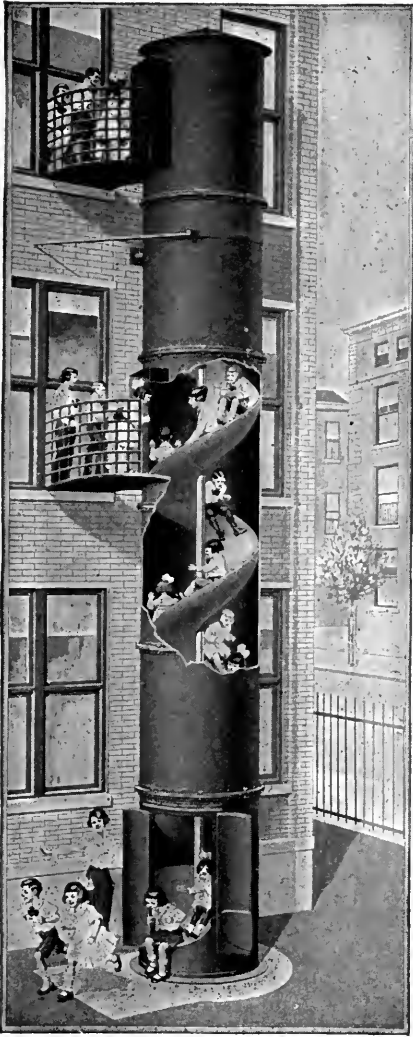
Chicago
Atlanta



GENASCO LINE

Trinidad Lake Asphalt
(For streets and roofs)
Standard Trinidad
Built-Up Roofing
Bermudez Road Asphalt
(For road building)
Genasco Roll Roofing
Genasco Sealbac Shingles
Genasco Latite Shingles
Genasco Vulcanite
Mastic Flooring
Genasco Acid-Proof Paint
Genasco Industrial Paint
Genasco Boiler Paint
Genasco Asphalt Putty
Genasco Asphalt
Pipe Coating
Genasco Asphalt
Fibre Coating
Genasco Tile Cement
Genasco Water-
proofing Asphalt
Genasco Waterproofing
Felts and Fabrics
Genasco Battery
Seal Compound
Genasco Mineral Rubber
Genasco Mineral Spirits
Genasco Base Oils
Genasco Flotation Oils
Genasco Motor Oils
Genasco Soluble Oils
Iroquois Road-building
Machinery

TRINIDAD — LAKE ASPHALT



A FIRE-ESCAPE THAT IS SAFE AT ALL TIMES

A Safe Fire-Escape for Schools

Many people are well acquainted with the spiral fire-escapes which have been exhibited from time to time at pleasure resorts and fairs. This type of fire-escape, known as the Kirker-Bender Spiral Slide, is manufactured by the Dow Wire and Iron Works, Louisville, Ky., and consists of a smooth, galvanized spiral slide enclosed in a cylinder 5 feet in diameter. It is constructed entirely of steel and is equipped with automatic entrance and exit doors. When used as an outside escape it rests upon its own foundation, not depending upon the building for its support, and is connected to the windows by means of iron runways protected by latticed iron railings. It is ordinarily placed between windows so as not to obstruct light. The entrance doors have projecting frames, and they can be opened inward without

interfering with the slide. These doors close automatically to prevent the entrance of smoke and heat. The exit doors open outward at a very light pressure of any object sliding against the inside automatic latch plate opening the doors. The slide comes within 18 inches of the ground, so that the escaping person will naturally walk away from the escape upon reaching the exit. A steel roof covers the escape, protecting it from ice and snow, which are such a menace to life on step escapes. This slide fire-escape may be incorporated within the walls of the building, occupying a comparatively small space.

Eliminating Service Box Trouble

To the superintendent of water-works who is looking for a service box in which he will find

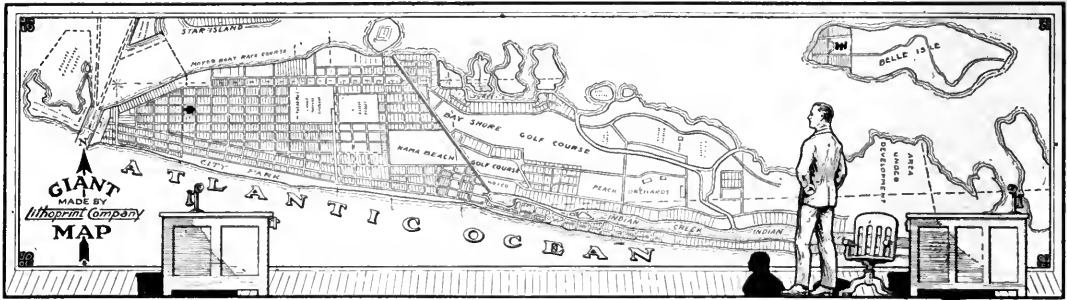
no more trash, no more broken or lost bolts or tops, which he will not be obliged to dig up to adjust the grade, and in which there will be no more damaged service cocks or leaky pipes, caused by heavily loaded wagons, and no more cocks that are inoperative by reason of failure to engage the key, the H. W. Clark Company, 130 South 17th Street, Mattoon, Ill., states that the C. M. B. service box which it manufactures eliminates all these troubles.

The Clark long screw cap in the top of the box needs only one revolution to open and raise the cap to a height of one inch. It is of cast iron and does not tempt theft as does the brass screw. The flanged top gives good support at the surface of the ground, and the bronze bushing prevents corrosion at that point. The fin at the side of the top prevents the box from turning, and the sliding extension of the body allows raising and lowering of the box through frost action without disturbing the base setting, and insures the proper height at all times. It also prevents surface loads and stresses from being communicated to the service cock or pipe. A heading between the upper and lower sections prevents them from separating. One feature of the heavy cast iron base is the two notches, one



AN EXTENSION SERVICE BOX

for the $\frac{3}{4}$ -inch pipe and one below for the 1-inch pipe which keeps the service cock always in the center. It is impossible for the box to shift lengthwise or sidewise, nor can the cock turn, as it is held securely by the interior box construction so that no rigid connection is required between the box and the service cock.



A Map As Long As A City Block

A GIANT MAP OF GIANT VALUE Of Course, "It's a ***lithoprint***"

THINK of it, Brother Engineer! A map actually made 30" wide and 1620" long, in one piece. And we could have made it 60" wide and as much longer as the customer wanted. Another job we handled successfully was a map in only *three* perfectly matched sections 162" wide and 180" long. These are two among many of the giant maps we have made that have solved questions that gave engineers many sleepless nights. The Lithoprint Process is the only way by which you can have maps made at a reasonable price that answer your every requirement for permanency, accuracy and legibility. Made with printers' ink on any material—paper, cloth or tracing cloth—and true to scale. Furnished mounted on rollers if desired.

Write for full information—a post card is sufficient. City Engineers should read our booklet "Assessment Maps: Their Construction and Upkeep." Sent without cost on request

Lithoprints—They Look Like Lithographs—Cost Like Blue Prints

LITHOPRINT COMPANY OF N. Y., Inc., 41 Warren Street, New York

A Financial Service For the Municipality

We are prepared to inform municipal officials regarding

1. Present cost of raising money
2. The most desirable method of financing

Our Municipal Department handles state, county and municipal bonds representing over thirty states in the union. Our experience and facilities are at the disposal of any municipality.

Correspondence invited

A. B. Leach & Co., Inc.

Investment Securities

62 Cedar Street, New York

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TRAFFIC STREET & ROAD SIGNS

Sewer Cleaning Equipment
Sewer Traps
Street Cleaners' Hand Carts
Other Municipal Equipment

WRITE FOR LITERATURE

THOMPSON-FLEMING

FORMERLY

BUFFALO MUNICIPAL EQUIPMENT CO.

174-176 Ellicott St.

Buffalo, N. Y.

Dry Feed for Water-Works

Many chemicals that are now applied in solution in water-works coagulation can be applied as dry powder if suitable control mechanism is available. Particularly is this true with alum, soda ash, sulphate of iron, and lime, the solutions of which can be eliminated by applying these chemicals in the dry state. Dry-feed applications bring an end to the difficulties from leaking tanks, corroded constant level boxes, clogged orifices, broken valves and the untidiness and disagreeable features common to all solution feed systems. Dry-feed application reduces labor, provides a ready check on chemicals, and in operation actually effects a saving in materials.

Wallace & Tiernan, Inc., Newark, N. J., have just placed on the market the Booth dry feeder, which is particularly adapted to the application of heavy water-works chemicals. The feed table, traveling at the slow rate of $1\frac{1}{2}$ to $8\frac{1}{2}$ revolutions per minute, depending upon requirements, is actuated by worm gears running in oil, by a $\frac{1}{2}$ -horse-power motor or other source of power. With any given set of gears the rate of revolution of the feed table is uniform. The rate of feed of the dry powder may be decreased or increased by raising or lowering the adjustable collar which surrounds the feed chute.

In order to insure an even flow of the powder from the storage hopper to the feed table, there is provided within the hopper an agitator which maintains a uniform supply of powder above the feeding point.

If solution feed is desired, the dry powder scraped from the feed table is discharged into the flushing hopper, from which it is conveyed by a stream of water to the point of use. If the feeder can be installed close to and just above where the dry powder is to be delivered, the flushing hopper shown in the foreground is not required, and a chute from the feed table may be substituted to deliver the powder which has been scraped off the table to the point of application.

Discrimination Needed

Chief Engineer Frank J. Daniel of the Wisconsin Inspection Bureau, Milwaukee, Wis., states there is much reason for worry among insurance companies and their representatives over what he believes to be a decidedly erroneous

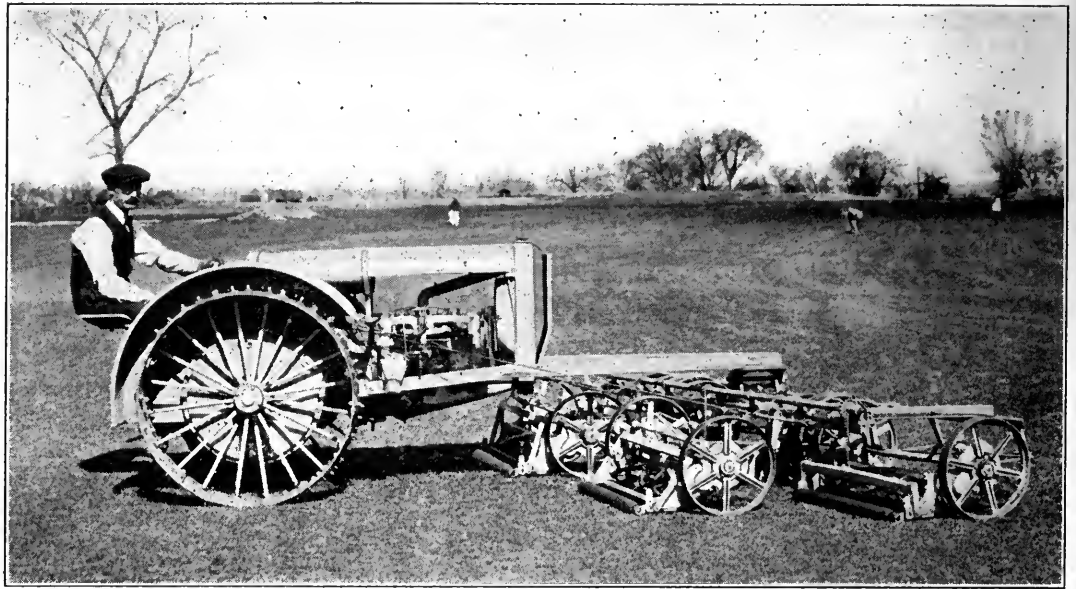


A NEW TYPE OF DRY-FEED MACHINE FOR WATER-WORKS CHEMICALS

tendency on the part of small cities when buying motor fire department equipment. Illustrating his point, he said that if one wants a watch, one goes to a jeweler's, but city authorities seem to be going anywhere but to experienced fire apparatus manufacturers for motor equipment.

"There is naturally a wide difference between experience in making automobile trucks and experience in making fire engines," he said. "Agents of companies that make the best promises of reratings if equipment is bought, seem to get the business. There are innumerable requests for reratings, and we frequently find that equipment and changes on which such requests are based were not even tested before being taken on and paid for. But recently a new motor fire pump burned out the bearings on the first test. In another case, a crank-shaft broke. City and town authorities disregard advice. Possibly they feel the advice is prejudiced, but the real student of these problems will not feel that way.

"Fire protection is water on the fire, not equipment or appearance. Tests can be had free of charge at any time. They do not cost the town a penny. There are no doubt good motor pumps built in many factories. The peculiar strains of the fire pump, however, are a problem very different from that of a truck for hauling. The fire pump must not fail, absolutely not. This is in itself a reason for making tests of new equipment before it is accepted and the old equipment discarded."



A New Triumph For

PENNSYLVANIA *Quality* **LAWN MOWERS**

THE Superintendent of the Denver Country Club hooked up a gang of five Pennsylvania Quality Lawn Mowers to his tractor.

The results showed a cutting capacity of 60 to 80 acres per day—about double that claimed for any similar method.

This arrangement has also been in use on the grounds of an Atlantic City Club, and an outfit has been just shipped to the City of Richmond, Virginia.

This is the most efficient and economical method of cutting grass on large areas especially where the surface is undulating and variable.

Each unit is complete in itself and interchangeable, and made with that skill and conscientious care for which the Pennsylvania Quality line is famous.

All the exclusive features of adjustment; self-sharpening, crucible steel blades, and automobile type ball bearings are embodied in each unit.

PENNSYLVANIA LAWN MOWER WORKS, Inc.
1615 North 23rd Street, Philadelphia, Pa.



STREET IN NUTLEY, N. J., TREATED TO ELIMINATE WEEDS

Eliminating Weeds from Slightly Traveled Roads

Roads, gutters and paths which are lightly traveled must be kept clear of weeds, if the appearance of a cemetery or park is to be maintained. The chemical method is to-day recognized from the economical standpoint as the only practical one for controlling undesirable weed growth. The Reade Manufacturing Company, 135 Hoboken Avenue, Jersey City, N. J., some time ago developed "Herbicide," which is used as a liquid to treat the roadway and gutter. It sinks into the ground, reaching and destroying the tops and roots of all existing growth, and having a sterile effect on the soil. It may be diluted heavily with water and applied with the use of a sprinkling equipment of any kind.

The old method of sending men over roadways with picks, hoes, shovels and scrapers to remove weeds is recognized by practice to be an absolute failure. By this method the tops only are removed. The roots remain in the ground and become strengthened, so that there is an abundance of regrowth after the first rain. Constant repetition of the work is therefore necessary during the entire growing season if the roads are to be kept clean. What is even more objectionable is the fact that the roadway is constantly disturbed, thereby creating a dust and making it impossible to keep a hard and smooth surface. The constant attention required makes the hand method costly when figured over one or more seasons.

The weed destroyer may be applied at any time during the growing season. It is advisable, however, to wait until all the weeds have made their appearance, and apply on a warm rather than a cold day, as circulation in plant life is more complete in warm weather. The solution is diluted with one part to 40 or 50 of water, to enable the weeds to absorb it more readily. One gallon of the material covers from 500 to 1,000 square feet of ground. The exact amount required is determined by the nature and thickness of the growth to be destroyed, and experimenting in a small way before using any quantity broadcast is the best

method of attacking the problem. It is distributed easily with an ordinary sprinkling can or with a barrel sprinkling equipment. A single application properly made destroys all existing growth. Too light an application, however, might mean that some slight regrowth would be experienced. This does not always, however, warrant retreatment. The following year one application should give a clean road for the growing season.

The American Highway Educational Bureau

James W. Brooks, well known for his educational propaganda in behalf of good roads while head of the Editorial Bureau of the Federal Highway Council, has resigned from that organization to become director of the American Highway Educational Bureau. Mr. Brooks announces that the change was made for the purpose of conducting highway educational work along more intensive and effective lines, supporting the Federal Aid construction of state and county systems as the logical first step in highway development.

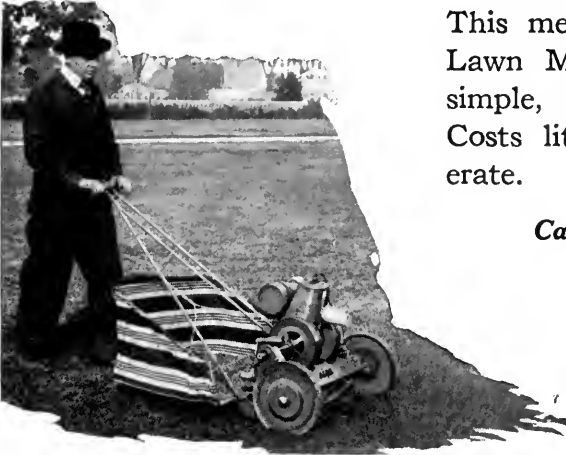
The production of "The Changing Road," the first standard road film ever undertaken, is now under way. The film is to be comprehensive in scope and official in character, and will be released during the early summer. It will portray the evolution of road construction and administration from primitive to modern methods, with the aim of educating the public away from cheap and uneconomical construction and of visualizing to taxpayers the real work which their state and county highway officials are striving to do in their behalf. This film will make a most interesting production for local good roads organizations and chambers of commerce, and for educational purposes in schools and among civic organizations.

New Municipal Engineering Firm

The new firm of McClure-Greene Engineering Company, 612-613 Park Building, Worcester, Mass., has been organized to specialize in municipal engineering, including water-works, sewers and sewage disposal, streets, pavements, concrete structures, bridges and dams, hydro-electric development and its associated structures. The members of this firm have had unusual opportunities in their respective lines. Frederick A. McClure was for 28 years City Engineer of the city of Worcester. Earl W. Greene, a graduate of Worcester Polytechnic Institute, has had 19 years' experience in railroad, municipal and concrete engineering, and George M. Wright has been associated with the Wright Wire Company since its organization 37 years ago as General Manager and President.

ON A PERFORMANCE BASIS

The keeping of the lawns of parks and playgrounds in condition will be determined on a business basis. It will go to the machine which will do the most, the best and at the least expense.



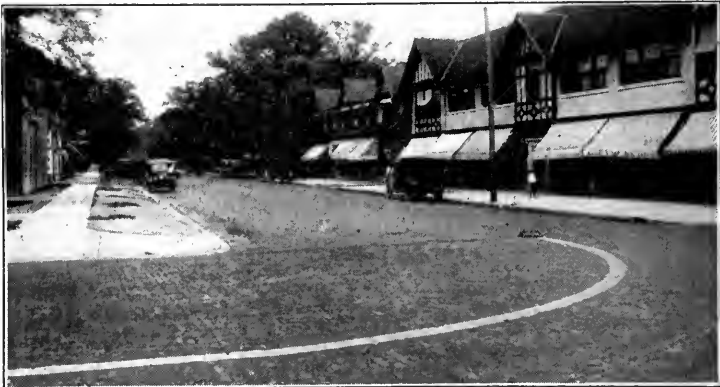
This means the 4-ACRE Power Lawn Mower. It is mechanically simple, practically accident-proof. Costs little to buy and less to operate.

*Catalog and information
on request*

**Jacobsen Manufacturing
Company**

1302 Fifteenth St. Racine, Wis.

MUSHROOM TRAFFIC LIGHT



WINNETKA, ILL., INSTALLATION

**CAST STEEL BRILLIANTLY LIGHTED ACCIDENT PROOF
THE UNBREAKABLE UNIT**

WRITE FOR BULLETIN

ELECTRICAL & SPECIALTY SUPPLY CO.

Madison Terminal Building, Chicago, Ill.

Added Police Protection for Banks

Hard times may not bring more crime, but they always bring a different type of crime. Swindles, frauds and like crimes flourish when times are good; robbery, violence and similar crimes increase when times are bad. Bank hold-ups in particular have increased within the last year, and city authorities have spent much time deciding how to prevent them.

The experience of the Cicero State Bank of Cicero, Ill., proves that the bandits can be fought successfully. Friday, April 15, six men drove up to the bank. The Vice-President, the Cashier, four other employees and three customers were in the bank. Five of the bandits entered and drove the customers and employees into the vault. As the Cashier stepped from his cage he pressed his foot on an electric button that carried the alarm straight to headquarters. Before the bandits had finished rifling the bank the police were at the door. One robber was slain, two were wounded, two captured, and a large money loss was prevented.

Prominent police officials claim that a direct connection to police headquarters that can be operated by foot, even while the employees are covered by revolvers, is the one really effective protection. Scores of banks in the leading cities now have this protection. Over one hundred and seventy-five banks in Detroit are connected directly to police headquarters, and a separate register is provided to receive the calls.

A study of the banks in Cleveland showed that the signal could be transmitted to police headquarters in six seconds and that the police could get to the majority of the banks within one minute. Within three minutes they could reach the bank furthest away. Forty banks are having the system installed.

The dozen banks in Buffalo, N. Y., have had this protection for twenty years. In addition, they have a watch service in connection with it. The central office is located at the Second Precinct police station, and three watchmen report in regularly at night, Sundays and holidays.

Lorain, Ohio, Lynn, Mass., Richmond, Va., and a number of other cities are giving this protection to the banks at no expense to the cities and a very small expense to the bankers.

The system is manufactured by The Game-well Company, which has manufactured and installed many police signaling systems throughout the country.

War Memorials

Memorial projects in connection with the late war will undoubtedly continue to occupy the attention of communities and organizations all over the country for some time. Large communities and organizations are able to employ architects and sculptors of national reputation to design and produce their memorials. There are, however, hundreds of smaller communities which are unable to command the services of such architects and sculptors, and which need the services of an organization of artisans which can produce memorials of distinctive and



A DIGNIFIED, ARTISTIC AND EFFECTIVE TYPE OF MEMORIAL TABLET

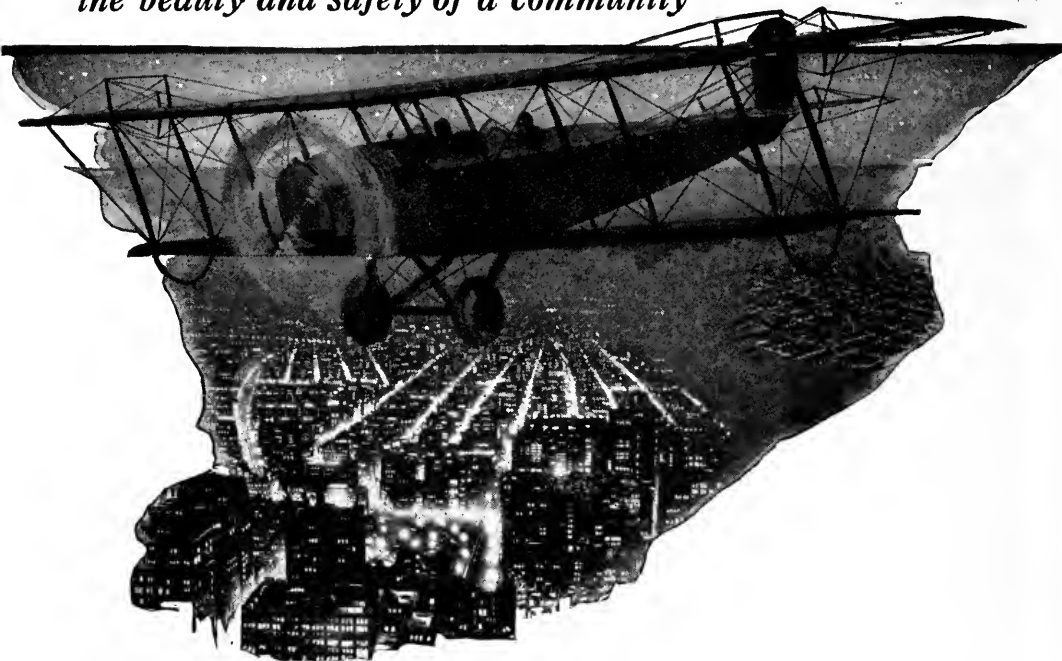
artistic design. The Department of Bronze Tablets and Memorials of the Flour City Ornamental Iron Company, Minneapolis, Minn., has endeavored to build up such an organization to effectively serve the smaller communities in particular.

The production of bronze memorials and statues is a highly specialized field of art which is limited to a skillful few in every age. In the United States the Flour City Ornamental Iron Company has gathered specialists in the production of bronze memorials, believing that memorials should be truly everlasting and distinctive. This company now occupies a 5-acre plant and employs skilled designers and draftsmen as well as sculptors and modelers of marked originality and accepted standing. It has a staff and production facilities probably unsurpassed in the country. Bronze work of almost any design and size is handled in as short a time as is consistent with its high grade of workmanship. Some idea of the artistic skill and facilities of this organization may be gained from the fact that it produces not only bronze memorial tablets and honor rolls, but bronze statuary, bas relief, and municipal and county memorial monuments, as well as ornamental bronze work for Federal, state and municipal buildings.

New Offices for Austin-Western

The Austin-Western Road Machinery Company has recently moved its offices to the new Wrigley Building, 400 North Michigan Boulevard, Chicago, Ill., where it has much more commodious quarters than at its old location at 910 South Michigan Avenue.

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Municipal Policewomen—Their Duties and Opportunities

By Lieutenant Mina C. Van Winkle

Director, Woman's Bureau and House of Detention, Metropolitan Police, District of Columbia

THERE are now about 300 cities with women police. In nearly all police departments women were appointed primarily for preventive and protective work and because of pressure by women's organizations. In Washington the Commissioners and the Chief of Police voluntarily established the Woman's Bureau because of need that grew out of the war emergency and because of their understanding of the different problems of the sexes, but the Bureau had a continuous struggle for existence against the forces of evil in the District of Columbia.

The local administration held that no man should be permitted to interview women offenders, especially sex offenders. They also made a survey of this country and Europe to determine the best method of functioning in a police department and decided that a single unit in the police department, made up of women, with a woman as directing head, which may be known by any one of several names—Woman's Bureau, Woman's Department, Protective Bureau, etc.—is the right thing, and they selected the name of Woman's Bureau.

Handicaps of the Policewoman

Any prejudice relating to the service of policewomen has resulted from the selection, through political preference, of women of ordinary type, with no training or ambition to measure up to the social needs of a police department, their chief aim being

to imitate the worst traditions of policemen as closely as possible. The second great handicap results from assigning women in police departments to a precinct under the control of a captain or detective who decides the use to which the woman's service shall be directed. Usually he places her in some clerical position and nine times out of ten concludes before he sees the woman that she is unable to render any service in the police department.

Women have therefore been more or less victims of ignorant police officers in the various cities. In other words, women's organizations have agitated for policewomen, gotten them assigned to police departments, then forgotten their existence instead of seeing that their services are utilized for the common good.

Private Agency vs. Police

In those cities where women have been given a free hand and permitted to serve to their full capacity, they have proved that service in the police department in preventive and protective work has infinitely more opportunity and wider scope for good than could be found in any private social agency attempting to function in the same way. The policewoman can give the maximum amount of time and energy for the good of the cause, and need not divert her service, as in a private agency, to securing funds. While one may be obliged to appeal to some authoritative body that ap-

propriates the public taxes for the general good, this happens but in a casual way once a year, thus freeing the public official from financial worry for the whole year's work.

The private protective agency has an important and valuable place in every community. It should be the great propagandist organization that will create public opinion, secure appropriations, watch, encourage, promote or criticize the public officials who are selected to carry out the community program, promote the perfection of social legislation and its enforcement, and socialize the courts, which are to-day obscured in so much dignity that the awed citizen is blind to their faults and equally blind to the virtues of the "cop."

Socializing the Police Department as a Whole

The communities' duty is not done when they have policewomen. Police departments, as a whole, the world over, should be socialized. They should be taught the meaning of the prevention of crime. They should not be permitted to so interpret the prevention of crime as to signify merely the prevention of the criminal's carrying out his plan.

There should be carried out in every city a truly preventive social program such as is being followed out in Berkeley, Calif., by Chief Volmer and his corps of officers, where the community is working in unison with the police, reporting to them the delinquent and potentially delinquent, where the map tells the story of the city's problem, where the police are making a constant survey and as constantly attempting to correct the anti-social conditions that make the work of police necessary.

Duties of Policewomen

The duties of a policewoman are: patrol of the streets and all places where girls are likely to loiter, with fixed post duty at railway stations in order to apprehend runaway girls or questionable women and girls who might be using the stations for a convenience; looking after stranded persons, and psychopathic cases; supervision of dance halls, moving-picture houses, and other places of commercialized recreation; assisting policemen in securing evidence against commercialized women, street walkers, and other offenders; securing temporary lodgings or committing apprehended

persons to the House of Detention; escorting young girls to their homes; interviewing and investigating all cases of women and girls that come to the attention of the police; securing physical and mental examinations so that the courts may make intelligent disposition of the cases that come up for their attention; voluntary probation for offenders who might under ordinary circumstances be taken to court or thrust into the street without any protection for the betterment of the girl's character, such as securing positions, decent associates, proper amusements, reestablishing church connections, working with the family on behalf of the delinquent—in fact, anything that will make for rehabilitation, without which the girl would drift into further delinquency and often into prostitution; locating missing girls and returning them to their homes, generally under escort of a policewoman—every attempt is made by the policewoman to remove or mitigate the causes of delinquency; shop-lifting cases; securing care and treatment of sufferers from venereal diseases; being present with female offenders in the Identification Bureau, and also searching them.

Salaries

Police departments employing both men and women recognize the value of the contribution made by women in special patrol work, in interviews and in investigation of cases. In some police departments women receive much lower salaries than the men; in many they receive equal pay, although the women as a rule are better educated, and have some kind of special training and experience before entering the service. One of the obstacles to securing such women as possess the prerequisites for good social service and who can pass a civil service examination of the proper type, is that the salaries are so permanently stabilized that there can be no expectation of a raise in pay except through promotion, which seldom happens.

If police departments are to secure the kind of social agents who are essential to the opportunity for service, the need for which is inherent in every department, they must pay to compete with highly specialized private social agencies which are paying high salaries to the employees. A woman who has education, training, and experience is surely worth more than a man who lacks



MEMBERS OF THE AVIATION FORCE OF THE NEW YORK POLICE RESERVE

all of these and who can only with the greatest effort pass a civil service examination covering a training he might get in eight grades of grammar school. The best police chiefs of the country agree that police departments to-day, since the drink evil has been largely eliminated, need brain and not brawn, and are asking for higher salaries, greater opportunity in general in the way of education and training for their men.

All civic groups should work for a higher wage scale in all police departments, one day's rest in seven, relief from the day's service if an officer is obliged to go to court on a case in his own time; in other words, that an officer may be allowed his regular hours of rest after being on, perhaps, twenty-four hours' duty, and a reserve officer sent to relieve him from the necessity of returning on that same day to his post of duty.

House of Detention

So that effective work might be done by the Woman's Bureau in Washington, it was found essential to place the House of De-

tention under the same directing head. The House is organized as follows:

First floor

1. Woman's Bureau
Application and complaint desk
Interviewing rooms
Record room
2. Clinic for physical and mental examinations only; no treatment
3. Receiving room and bath for boys
4. Steam laundry
5. Storeroom and boiler room
6. Shower and locker room for policewomen

Second floor:

1. Director's office
2. Superintendent's room
3. Employees' rooms
4. Dining-room
5. Emergency rooms for dependents or for stranded women and girls
6. Recreation and school room
7. Receiving room and bath for girls

Third floor:

1. Recreation and occupation room for boys
2. Bedrooms for white boys
3. Bedrooms for colored boys
4. Boys' showers and toilets
5. Boys' dining-room
6. Bedrooms for officers and caretakers

Fourth floor:

1. Recreation and occupation room for girls,

2. Bedrooms for white girls
3. Bedrooms for colored girls
4. Dining-room for girls
5. Kitchen
6. Showers and toilets for girls
7. Bedrooms for officers and caretakers

Children, unless ill or very bad, are not permitted to be in their bedrooms during the day. They go there to sleep at night and to clean up in the morning. The daytime is spent in various occupations and in recreation in the rooms assigned for that purpose, and in a few weeks there will be an organized playground in the rear of the building for outdoor exercise and play. The inmates take part in the work of the household, helping the cook, the superintendent, etc., with the various chores. Seventy cents a day is allotted for each person's food. Breakfast consists of a cereal, bread and butter or toast or some hot bread, and milk. Mid-day dinner consists of meat or fish, two vegetables, bread and dessert; supper of stewed fruit, bread and butter and milk or cocoa. The best of everything is bought, and the preparation of the food is as in any good home.

Importance of a Good Police Department

No city is better than its police department. Every square may have a church, and the city may have hundreds of social activities supported by private initiative and financial contributions, but if the police remain unsocialized and their service not used to the maximum of opportunity and capacity, the social program will be ineffective. Washington is the capital of the United States, for which the citizens of every state in the Union are equally responsible with the local residents. To this city you send your lawmakers uninstructed. They make the laws and appropriate the funds for the work of the District of Columbia. Laws, institutions and funds are both totally inadequate to its needs.

Needs of the District of Columbia

Urgent needs of the District of Columbia are:

An institution for the segregation of the feeble-minded. This would leave only a small and hopeful delinquency problem.

A reformatory for women over seventeen, with proper facilities for the care of the venereally diseased, and occupational therapy by means of which the prisoners may accumulate a little money so that they can make an unhampered start in life and not immediately upon release be thrust back into the old unlawful practices.

Laws for the control of venereal disease.

Jurisdiction of the Juvenile Court over girls up to the age of twenty-one and over all offenders against children, or a family court in which offenses by and against children may be handled and where all who contribute to the delinquency of children can be disciplined.

A curfew law preventing children under sixteen from attending the movies or dance halls or any other public recreation unaccompanied by parent or guardian.

A law to make physical and mental examinations obligatory in all cases of juvenile offenders and of all prisoners who are "repeaters" or who have committed sex offenses, etc.

A central national bureau for missing persons. By this medium of exchange of information many girls could be saved from lives of prostitution and their families from humiliation and shame.

Private hearings or hearings in chancery for sex offenders.

A seduction law to make women responsible for the seduction of young boys, just as men are responsible for the seduction of young girls of previous chaste character.

A desertion law to include women who should be held responsible for the physical and moral care of their children, and men responsible for the support of the family.

A law which will allow persons to be held responsible for contributing to the delinquency of minors.

A law raising the age of consent to eighteen years.

A strong and workable dance hall ordinance.

Women marshals in the courts and women jurors.

Prompt trial of all offenders against children, especially in carnal knowledge cases.

Indeterminate sentence.

Shade Tree Planting

A Commission Controls Planting in East Orange, N. J., Adding Beauty to the Streets and Satisfying the Community

By Ernest H. Bennett

Secretary, Shade Tree Commission, East Orange, N. J.

UNDER the laws of the state of New Jersey and by a municipal ordinance, a Shade Tree Commission was established in 1907 in the city of East Orange. While the Commission has the power to control the parking strip between the curb and the sidewalk, and the decision as to what kind and size or type of trees and shrubs may be used along the city streets, it is working in full harmony with the individual property owner, to the end that practical and attractive shade trees shall be maintained throughout the city. A study is made of the tree best suited to both the soil and the architectural features of the particular block, street or section on which the planting is proposed. There is no set or uniform tree or spacing. On the older streets where trees were already in existence before the organization of the Commission, it is trying to save the good trees by pruning, cultivating and surgery, replacing them where necessary at that time, keeping in mind the correct spacing, as it is found that on many of the old streets the trees are much too crowded.

On the newer streets one species of tree is planted to a block or a whole street, as circumstances warrant, varying them on the different streets, thus breaking any possible monotony by giving variety of form and color. This method also serves to isolate any attack of blight and prevents its spreading over a large area.

The Commission recommends and uses elms, red and pin oak, small- and large-leaf lindens, ginkgos, red maple and the old stand-by, Norway maple. The sugar maple is being discarded for use on streets because of the lack of water through the impervious pavements on the street and sidewalks and the reflected heat from the oiled roads. It has also been necessary to abandon the use of the Oriental plane, because a large number have been lost from severe winter frost cracks. The soft maples and the poplars are being cleaned out as fast as possible, as they are expensive to trim, do

great damage in the stoppage of sewers, in raising sidewalks and destroying the alignment of curbs and gutters, and make it very difficult to keep attractive lawns near them.

Any new street is planted at the request of the property owners, the cost of such planting being charged against the property in front of which it is done, according to the spacing required to locate the tree. The present charge is \$6 per tree, which includes stake and wire guard, perpetual maintenance and replacement in case it should die, without further charge to the owner.

The success of the Commission is largely due to the cooperation of the citizens, who are greatly interested and who assist very materially in reporting any trouble in connection with the trees which they may have noticed and which may have been overlooked in the course of routine work. There are about 35,000 trees in the city of East Orange, and they are valued conservatively at \$820,000 on a basis established by the State Forester. The appropriation for 1920 was \$13,000 to carry on all the work. This indicates the small cost of maintenance in comparison with the tree value, which is such a great asset to the city.

It is doubtful if the money expended by a city in any other public work brings such great return on the investment, particularly when controlled by a body of interested workers. In fact, I would go further and advocate that not only should streets in cities and towns be planted, but that every road available for travel throughout the United States should be planted with shade trees. It would not only increase the pleasure of travel between cities and towns, but would lower the cost of maintaining roadways, by reducing dust and mud, would improve landscape effects and add to our national wood supply to the extent of some nine or ten million acres, based on Government estimates of 55 trees of 10-inch diameter to the acre. Many of these trees could be of the nut-bearing variety and thus be annual revenue producers.

Street Lighting Costs in Kansas City, Mo.

An Interesting Installation of Concrete Posts with Cables Placed Under Sidewalks

By H. H. Kuhn

Assistant Chief Engineer, Kansas City Power and Light Company, Kansas City, Mo.

BALTIMORE AVENUE, Kansas City, Mo., has only recently been opened up as a new outlet from the business district, and because of this the conditions of sidewalks and premises on either side of the street were not uniform. Soon after the street was opened up, the Kansas City Power and Light Company installed 600 candle-power multiple lights with Novalux fixtures on concrete posts on Baltimore Avenue from Twelfth Street to Southwest Boulevard. These posts are staggered on both sides of the streets and are served by a multiple conductor installed in the sidewalk and laid in sand under the walk. In some places it was necessary to channel the concrete sidewalks to provide space for the conductor, which was laid in sand, the sidewalk being replaced after the conductor was laid. At other points the sidewalk has not been installed and it was not necessary to channel through the concrete walk.

The costs given below, because of the variable conditions, do not cover a specific type of installation and do not represent the true costs of an installation where it would be necessary to channel the concrete walk for the entire distance, or where it would only be necessary to bury the cable in the dirt. The total length of the work was 3,244 feet, and the cost of the installation, including the concrete posts, as illustrated, fixtures, conductors and all other miscellaneous materials, was \$8,882.85 for a total of thirty-six 600-candle-power lights. The above has been divided under the following headings: Cable and Installation; Conduits and Installation; and Posts and Fixtures and Installation:

CABLE AND INSTALLATION*

Cable	\$2,697.11
Labor	657.55
Truck expense	32.76
Miscellaneous material	254.66
	<hr/>
	\$3,642.08



TYPES OF CONCRETE LIGHTING STANDARDS IN KANSAS CITY, MO.

CONDUIT AND INSTALLATION

Conduit	\$ 66.31
Labor	1,880.92
Truck expense	107.26
Street repairs	159.09
Miscellaneous material	473.86
	<hr/>
	\$2,687.44

POSTS AND FIXTURES AND THEIR INSTALLATION

Labor	\$ 302.73
Posts	1,100.00
Truck expense	26.16
Freight on posts	172.89
Lamps	205.76
Fixtures	670.50
Miscellaneous material	74.29
	<hr/>
	\$2,552.33
Total	\$8,881.85

* This includes the channeling of the sidewalk and replacing of the sidewalk after the installation was made.

Electric Rates and Rate-Making—Part I

A Practical Discussion Prepared Especially for Municipal Officials

By Charles M. Fassett

THE mysteries of "kilowatts," "kilo-volt-amperes," "connected load," "maximum demand," "service charge," "quantity discount," and "meter factor," confront in a most confusing way the city official whose duty it is to fix rates for a municipal electric plant, or to uphold the city's contention for proper and reasonable rates for its citizens from the utility corporation operating under franchise in the city. The problem in at least one of its aspects is bound to arise in every city and town in America, and it is the purpose of this article to make more plain and understandable to the layman the fundamental principles of electric rate-making and the factors which should be considered in fixing rates, which, under most regulatory laws, are required to be "fair, just, reasonable and sufficient."

How may consumers tell what it costs per month, with a rate of ten cents per kw. hr., to keep the light going on the front porch all night? How many can read the electric meter and determine if their monthly bills are properly figured and the totals correct? How many know what their average monthly lighting bill should be, and the proper ratio between July and January requirements? And some of these consumers will be elected to city offices and have as part of their duty to see that their neighbors are treated fairly in electric rates by the municipal plant or the utility company. They may be required to contend for just rates before courts or commissions against skilled engineers and experts in private employment, and the public, their employers, will suffer from their lack of understanding.

In the early history of electric lighting there were no meters. All rates were "flat rates," and the bill was easy to figure. You paid for lights whether you used them or not, and you paid according to the number of outlets in your house. Waste always follows flat rates for any service, and flat rates are unfair to the careful user of any utility. Soon the demand outgrew the

plant capacity, and enlargement was postponed by the introduction of meters. The rates then became important, and as costs and other factors which enter into rates were studied, the tendency developed of making the rates complicated to meet these varying factors. The present tendency is toward simplification, but rates yet exist that are so intricate as to baffle most officials who may try to understand them, and which no layman may even hope to comprehend. We now admit that in rate-making absolute justice is unattainable; that if we could attain it to-day, it might be unjust to-morrow; that, therefore, we do well to combine justice with expediency and strive for a rate which is as nearly equitable as possible as between the various classes of consumers, without being so complicated that the ordinary man may not understand it, and that will yield the earnings that are fair to the business.

I. Factors of Cost

Production.—Power is the first essential to production of electric current, and the cheaper the power, the cheaper the product. Water-power is always used when available, on account of its comparatively low cost; and its availability depends upon the cost of its development and its distance from the point where the electric current is to be used. Steam power is the usual alternative.

A valuation of plant is the first step in rate-making. Courts and commissions pay little attention to the financial operations of the past or to the outstanding securities or their market value, but endeavor to find out the actual value of the plant, or of that portion of it which is used and useful in meeting present demands and a reasonable expectation of increase by the growth of the community or the business. Prices of materials of construction are usually based upon averages for five or more normal years, and allowances are made for such items as engineering, interest during construction, commission on the sale of bonds,

and contingencies, in addition to the cost of sites, labor and material, machinery, and superintendence.

When the plant value is ascertained, the expense of production may be found by determining interest on the investment, cost of maintenance and operation, and depreciation, and dividing these into total output. If this output is reasonably close to capacity, the production cost at most water-power generating plants will fall below one-half cent per kilowatt hour of current produced, and in steam plants below one cent per kw. hr. The first three factors of production, cost, interest, operation and ordinary repairs, are easily found, but the fourth, depreciation, is not so readily ascertained, and in some cases it is entirely neglected, although it is a proper and essential cost item. A depreciation reserve should consist of such annual sums set aside as will be sufficient, with the accumulated interest earnings, to cover the cost of every item of plant at the end of its normal life. The juggling of depreciation reserves is one of the favorite indoor sports of municipal and private utility management.

Transmission.—The transmission system takes the current as generated, transforms it to higher voltage, carries it to the substations near the point of use, and again transforms it down to lower voltages for distribution. The higher the voltage, the less copper is needed in the transmission lines; as copper is costly, the limit of high voltage tends to rise, and we have not yet learned its economical limit. The cost of transmission contains the same items as production cost, plus the line and transformer losses, and is affected in the same way by the relationship of the current transmitted to the total capacity of the line.

Distribution.—The distribution system takes the current at the substation, carries it to the consumer's premises, transforms it down to his requirements, and delivers it to his meter. It consists of poles, wires, cables, transformers, and underground conduit, all subject to like conditions of cost as are production and transmission, with the additional item of underground construction in certain sections, and the consumer's connection with the street mains.

Load Factor.—The load factor of a system is the proportion which actual deliveries of current to consumers bear to the maximum load, and it has a vital relation

to the cost of current, particularly with a water-power production plant. A steam plant of considerable size usually consists of several units, separate steam engines each driving its own generator, and one or more of these units can be shut down when demand slackens. As coal is the chief item in operation costs, these costs may conform to the demand from hour to hour during the day and thus be kept more closely related to output. It is the constant effort of good management to keep the load factor high, in order to use the facilities of the plant to the fullest extent possible, and thus decrease the cost of kw. hr. production. This is done by encouraging all sorts of "off-peak" use of current, such as small-power usage, cooking ranges, household and labor-saving appliances, and sometimes by making specially low rates for power, which is shut off as the hours of lighting peak approach.

Superintendence.—Good management is necessary to successful operation of any business and is always worthy of adequate remuneration. The many technical details of operation of an electric plant demand expert attention and control, and the relations of such a plant to its consumers and to its stockholders require foresight, intelligence, and business ability. These qualities are not all readily found in the same person, but should be sought, and, if found, such a man's salary will probably be the most profitable expenditure of the concern, and will lessen, rather than increase, the cost of output.

General Office.—In municipal plants the office cost will likely be limited to accounting, meter-reading and collection. In privately owned plants, there will be added rent and salaries of officials. The city official interested in rates will insist that the general office expenses are kept down to a reasonable figure, that only its proper portion of general expense be charged to the light and power plant in cases where the utility operates other lines of business, such as a gas plant or street railway.

II. Profits

Interest on plant costs is included in the service costs above enumerated. Six or seven per cent is usually allowed by commissions, and this, in private operation, is applied to bond interest and dividends on stock. But no capitalist would invest in a

public utility business unless there were promise of a greater reward than interest at the legal rate; he can invest his money where the risk is less and the earning as good. A surplus is necessary, a reserve fund which may be needed to meet unforeseen requirements, or to carry the business over the lean years which come to most undertakings. Unless the earnings are more than the costs, the business is always on the verge of bankruptcy, and this is not a desirable condition, either for the utility or for the public which it serves.

The financial past of most of the older utility corporations will not bear close scrutiny, nor will their relations with state legislatures and city councils; but if our present rate-fixing efforts are based upon actual value, we may as well forget the past, for which we are probably as much to blame as the other fellow, and try to adjust our present and future relationships on a basis of honesty and justice. In the utility business there is a constant demand for new capital as the business develops and the community grows; there are extensions required and additions to plant needed to keep up with growing demand, and new capital is difficult to obtain unless the business is solvent and the promise of profit substantial. If the utility cannot expand, the community suffers. We must be fair to our utility corporations, as well as insisting that they be fair to us, so long as we elect to allow private corporations to serve us in this field.

III. Service

Good service costs more than bad, and is worth more; and this must be considered in rate-making. Comparisons of rates charged in various cities do not mean as much as they would seem to indicate upon the surface. Of course we may reasonably suspect that something is wrong when there is a six cent rate per kw. hr. in one city and a sixteen cent rate in its neighbor, and yet it is quite possible that both rates may be justified. One may represent the service of a decaying and insufficient plant, with slack management and poor facilities, furnishing a service of low voltage and frequent interruptions, one which is put out of business by every clap of thunder, while the other is well equipped, abundantly financed and efficiently managed, and has

stand-by equipment sufficient to care immediately for all emergencies.

When the lights go out for fifteen minutes in the middle of a theatrical performance, or the current quits while the dinner is being prepared on the electric range, it may be unpleasant evidence that we are not paying enough for electric service. If we are willing that our streets be encumbered with poles and wires, we should not be asked to pay as much for current as we would be willing to pay if the more expensive underground cable and conduit construction were required of the electric company or the city's plant. If extensions are promptly made and service connections and meters promptly installed at the expense of the company, either new money must be available for capital additions, or the rates must cover these costs as well as those of plant production.

IV. Public Policy

There are certain matters of public policy which influence electric rates, and these must be determined before we are ready to begin our rate-making. Some have been considered in the preceding section. If we demand good service, penalizing the utility for lapses in voltage and interruptions in service; if we insist upon underground construction in part or all of the city; if we require storage batteries and stand-by plants, to insure against interruptions, we must provide the means for them and they must be considered in rate-making. It is the established policy of municipally owned plants to furnish service at cost, but we have found that the exact cost is difficult to arrive at and that safety impels us to make the rates high enough to cover a safe margin above cost. It is easier to lower a rate than to raise it.

Municipal plants are usually financed by bond issue, and money so obtained must eventually be repaid. How rapidly shall we pay this debt? A private utility company seldom attempts to retire its bonds, but its tendency is to continually increase the outstanding obligations and disburse excess earnings in dividends. The only dividends of a municipal plant are represented by better service and lower rates. When a bond is retired from excess earnings, it ceases to draw interest and thereby reduces the fixed expenses of the undertaking and ultimately reduces rates. But

a too-rapid debt retirement means an added burden upon the consumer of the present in order to reduce that upon the future citizen.

V. Earnings

Let us then assume for the purpose of rate-making that the total earnings of the privately owned utility must cover interest on property used and useful, taxes, operation and maintenance, depreciation, super-

intendence and general office expenses, with a safe margin of surplus; and that of the municipal plant must cover interest on bonds still outstanding, operation and maintenance, depreciation, general office expenses, with such payments on the principal of bonded debt as shall have been decided upon as good public policy; and that the earnings in each case must be adequate to meet the costs of the character of equipment and service which we demand.

(The discussion of Rates will appear in the September issue of THE AMERICAN CITY)

The Importance of the Annual Health Report

By Virgil D. Selleck, M. D.

Health Officer, Glens Falls, N. Y.

THERE are at least three good reasons why an annual report is important. The health officer, who is the authoritative head of all city health departments, is a public official, and the public has a right to expect an accounting of the work which he has done and of the funds that have been expended. The science and art of public health have progressed to a point where they can render to the public an actual saving of lives measured by dollars and cents. It is the work of the health officer to save as many lives as possible by the intelligent application of the resources at his disposal. If the health officer is wise, he will direct his energy and resources according to the indications originating from a study of vital statistics included in his annual report. Hence, a second reason for the necessity for such a report; in fact, it is the basis on which the work for the coming year should be planned and the proper appropriation made. Third, and by far not the least in importance, it is to the health officer an indispensable review of the year's work and the basis on which to make recommendations for the future.

The character of the annual report will, of course, vary somewhat according to the activities covered, but, according to my idea, it should be written for the public rather than for public health experts. It should be educational, written in a newsy style avoiding too many technical terms, and should include only such statistics as have

to do with local problems.

For convenience it may be well to divide the activities into field work and office duties. In the field work may be included such activities as communicable disease control, public health nursing, child welfare, milk and food inspection, etc., and under office duties may be included records, correspondence, vital statistics, accounting system, etc. Under each subdivision a summary of the work of that particular phase should be so written as to be instructive and interesting. The first step is to do good work, and the second is to make it known and understood, and the annual report is one of the best methods of giving publicity to your work and educating the public in health work.

The climax of the annual report should be the recommendations. It is far better to make one or two specific recommendations each year and try to get them carried out, than to make a large number and have none executed.

The feelings of the people towards a health department will depend largely upon their conception of what public health means and its relative degree of importance in the community. This is measured by the attitude of the health officer and his staff of assistants towards the public. He should take the public into his confidence by giving them an understandable report of his work.

ACKNOWLEDGMENT:—From a paper presented to the annual convention of the New York State Conference of Mayors and Other City Officials.

A Detail in City Planning

By Jules Kortenhorst

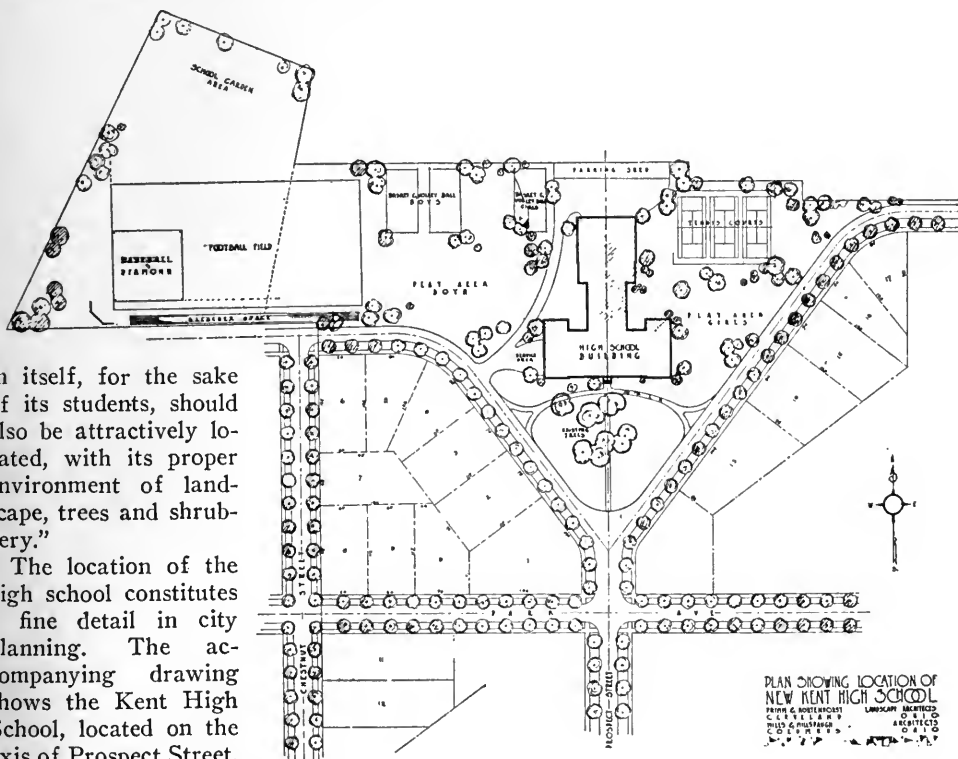
"RELATIVELY few communities of the size of Kent, Ohio, have high school sites which may be considered better than the one which you have selected for Kent." This comment is quoted from a letter of Dr. Engelhardt of Teachers College, Columbia University, New York City, to the Board of Education of Kent, Ohio.

During the last few years Dr. Engelhardt has visited a large number of communities throughout the United States for the purpose of recommending sites, or of discussing with school authorities their school-building programs. In his visits to Kent he has pointed out "the desirability of locating a community project so that it becomes a most attractive element in the entire municipal situation. The environment of such a plant should be such as to give it the most esthetic setting and in that way present an appeal to those who are planning to become residents of the community. The high school

a beautiful residential avenue, lined with stately maple trees. The building will terminate this street at the proper scale, and an existing clump of old trees in front of the building will enhance the appearance and soften the architecture of the structure and will throw interesting shadow forms on the front façade, during parts of the day, especially as this façade faces the south.

The cost of the land would have been unnecessarily high if the entire parcel had been acquired as school property. The 15 acres which the site includes was not needed for athletic play and garden areas, and a solution was effected whereby approximately 9 acres was deeded to the school board and the remaining 6 acres subdivided into building lots.

The specific character of this city detail will be still more appreciated, if it be noted that Prospect Street north of Park Avenue branches off westerly and easterly, thereby attaining an isolation for the school grounds



in itself, for the sake of its students, should also be attractively located, with its proper environment of landscape, trees and shrubbery."

The location of the high school constitutes a fine detail in city planning. The accompanying drawing shows the Kent High School, located on the axis of Prospect Street,

and the surrounding building lots which will make a more unconventional architectural treatment justifiable and even commendable. The building is located away from the noise and dirt of railroads and about two blocks from the street car line and the main traveled street.

The topography of the land has made it possible to secure immediate access to the basement from the service area, as the land slopes from east to west. A stretch of level land, however, permits the development of an athletic field without an excessive amount of grading.

General Data on Garbage Disposal in American Municipalities

City	Population Contributing	Method of Disposal	Remarks
Albany, N. Y.....	100,000	Fed to hogs.	
Akron, Ohio	176,000	Reduction from 1916 to March, 1920.	
		Fed to hogs since March, 1920.	
Boston, Mass.	750,000	Partly by reduction.	
		Partly by hog feeding.	
Bridgeport, Conn.	100,000	Reduction.	
Chicago, Ill.	2,600,000	Reduction.	
Cleveland, Ohio		Reduction.	
Denver, Colo.	255,000	Fed to hogs.	
Detroit, Mich.	1,000,000	Reduction.	
Grand Rapids, Mich.....	137,000	Fed to hogs.	
Houston, Tex.	165,000	One-third incinerated.	
		Two-thirds placed on dumps.	
Kansas City, Mo.....	325,000		Garbage collected and disposed of by contract at cost of \$69,000 to the city.
Los Angeles, Calif.....	576,000	Reduction.	
Louisville, Ky.	261,000	To farmers.	
Lowell, Mass.		To farmers for hog feeding.	
Milwaukee, Wis.		Incineration.	
Minneapolis, Minn.	381,000	Fed to hogs by contractors.	Discontinuance of feeding ordered, by District Court May, 1920.
New Haven, Conn.....	146,000	Fed to hogs.	
Philadelphia, Pa.	1,820,000	Reduction.	
Pittsburgh, Pa.....	583,000	Digester system.	
Portland, Ore.	258,000	Incineration.	
Providence, R. I.....		Fed to hogs.	
Reading, Pa.	107,000	Reduction.	
San Antonio, Tex.....	161,000	Dump.	
Spokane, Wash.		Incineration and hog feeding.	
Springfield, Mass.	135,000	Fed to hogs.	
Toledo, Ohio	240,000	Reduction.	
Washington, D. C.....	400,000	Reduction.	
Worcester, Mass.	200,000	Fed to hogs.	
Youngstown, Ohio	133,000	Reduction.	

CITIES COMBINING THE COLLECTION OF GARBAGE WITH THE COLLECTION OF OTHER CITY WASTES

City	Population Contributing	Method of Disposal	Remarks
Elizabeth, N. J.....	100,000	Dumped on low, marshy grounds.	
Memphis, Tenn.	163,000		
New Orleans, La.	387,000	Incineration and dump.	
San Francisco, Calif.....		Residence garbage incinerated.	
		Business garbage fed to hogs.	
Seattle, Wash.	299,869	Sanitary fill.	Hotel and restaurant garbage sold to hog raisers. No revenue to city.
Tacoma, Wash.	60,000	Sanitary fill.	Toll system. Each householder pays contractor for amount collected.
Trenton, N. J.....	115,000	Incineration.	
Troy, N. Y.....	80,000	Buried under ashes and other municipal wastes.	

Moving Hibbing by Tractor and Truck

Minnesota Town in Iron Belt Forced to Move Houses Because of Undermining

By George M. Fisher

HIBBING, Minn., located in the center of the great iron belt of the Mesaba Range in northern Minnesota, is bounded by iron ore properties. For the past ten years the most densely populated district of Hibbing has been surrounded by open pit mines, making it impossible for the village to expand on its original site. The Oliver Iron Mining Company, a subsidiary of the United States Steel Corporation, acquired the right to the minerals un-

part of the business and residential district of the old village has actually been moved.

Two hundred buildings are being removed from the original town site to South Hibbing, an average distance of about two miles. Seventy-five buildings will be dismantled and the material used in the construction of other buildings at the new site. Included in the cost of moving are such items as jacking up and moving on trucks, new foundation, repairs to building due to break-



MOVING A SMALL BUILDING BY TRACTOR FROM HIBBING TO NEW HIBBING

der this site by lease in 1899, and two years ago began to buy surface rights. It paid \$2,500,000, and to-day owns the majority of lots and buildings in an area of more than eight city blocks. After these purchases were made, it became necessary to acquire a new location for that portion of the village that had to be transplanted. One mile away was the Central Addition, owned by the mining company, and here is to be located the "New Hibbing." The moving of the city with its buildings, streets, alleys and utilities would be a gigantic task, but only

ages or damages in moving, painting, and sewer and water connections, all of which vary widely for different types and kinds of buildings.

Various methods of moving have been used. If the structure is small and can be dismantled readily, it is taken down, loaded on motor trucks and moved to the new location. Other moderate size buildings and some large ones have been moved on rollers in the familiar way, but tractors have been used for the motive power, instead of horse and capstan.

The Lincoln Highway of To-day

America's Main Street, 3,300 Miles from New York to San Francisco, on Which \$31,284,520 Has Been Spent in Seven Years for Permanent Improvement

IT is significant that of the expenditures made by the various states on Lincoln Highway improvement in 1920, a vast proportion was put into permanent work, that is, construction designed to stand up under the traffic of the future with a minimum yearly maintenance expense. The following tables show the mileage of each type of construction completed on the Lincoln Highway during 1920, as well as the mileage of preparatory work in the way of grading and graveling, and will be of interest in showing the net results of the funds expended:

TYPES OF NEW CONSTRUCTION ACCOMPLISHED ON THE LINCOLN HIGHWAY, 1920

	Miles
Concrete	127.5
Brick	7.1
Bituminous macadam	12.2
Macadam .....	.5
Gravel	187.8
Permanent earth grade	206.9
Total	542.0

SUMMARY OF EXISTING CONDITIONS ON THE LINCOLN HIGHWAY

	Miles
Concrete	422.34
Brick	219.68
Bituminous macadam	401.81



A MACADAM SECTION OF THE LINCOLN HIGHWAY IN PENNSYLVANIA

	Miles
Macadam	287.10
Asphalt	78.00
Creosote block	5.90
Granite block	7.10
Graded gravel	956.00
Natural gravel	62.10
Graded earth	725.67
Natural earth	136.00
Sand	3.30
	<hr/> 3,305.00



EASTERN OHIO IS HILLY AND THE NEW CONCRETE LINCOLN HIGHWAY FREQUENTLY TRAVERSES DEEP CUTS AND LONG HILLS, AS SHOWN ABOVE IN COLUMBIANA COUNTY

The Lincoln Highway in New Jersey is the heaviest traveled and most congested highway of its length in the United States. Traffic counts have indicated an average of over 1,000 vehicles an hour for the daylight hours, much of the travel, over 50 per cent,

being heavily laden trucks. To carry this travel, the state has been engaged during the past three years in reconstructing the road, which was all macadam, to the following specifications: width of grade, 18 feet of Portland cement concrete pavement 10½ inches thick at the center, 8 inches thick at the sides, adjoining the concrete pavement on each side, 3 feet of bituminous macadam shoulder, 6 inches thick; outside the macadam shoulder, 3-foot earth berms.



BEAUTY, AS WELL AS STRENGTH AND UTILITY, CHARACTERIZES THE NEW LINCOLN HIGHWAY BRIDGES

Pennsylvania's Progress

The Pennsylvania State Highway Department during 1920 instituted some very interesting traffic counts on the Lincoln Highway. As was expected, the heaviest volume of travel on any section of the route was east of Philadelphia, where the Department's investigation indicated that 773,604 tons move over the route annually, 56 per cent of this tonnage being commercial.

Permanent Construction Cuts Maintenance Costs

The State Highway Department of Pennsylvania, which has available over \$80,000,000 for permanent highway construction, has adopted a policy of building nothing on main routes of travel less permanent than reinforced concrete, or a concrete base with asphalt or brick surfacing. The maintenance charges for the past several years have been necessarily close to \$5,000 per mile per year. The Lincoln Highway has been kept in particularly good condition because of the tremendous volume of travel using the route between Pittsburgh and Philadelphia. The maintenance expense on the more than 250 miles of the route in Pennsylvania under state jurisdiction, including the expense of snow removal during the winter of 1919 and 1920, when gangs were kept continuously employed in keeping the route open, closely approximated \$500,000.

Restricted Improvement in Ohio and Indiana

The extent to which Ohio was hampered by the general conditions operating to restrict highway improvement during 1920 is shown by a comparison between the highway mileage completed during the year and that which remains under construction or merely under contract at the end of the year. The state completed 19½ miles of concrete, brick and macadam construction at a cost of \$507,612 out of

a total program for the year which contemplated the completion of 53½ miles. Ohio was left at the end of the 1920 road-building season with 34 miles of brick, concrete and macadam construction uncompleted, but under contract, amounting in cost to \$1,355,447.

Indiana's plans were affected by the general road-building situation during 1920, so that the state planned on building only 45 miles of concrete on the Lincoln Highway, at an approximate cost of \$1,350,000. The state actually completed during 1920 short sections of three different projects, totalling approximately 10 miles and costing \$294,746.

Banner Year for Illinois

Illinois completed 341 miles of hard-surfaced roads during 1920, a greater mileage of similar type of construction than was ever built in any previous year by any



INDIANA HAS MANY MILES OF FINE MONOLITHIC BRICK PAVEMENT LIKE THE ABOVE IN NOBLE COUNTY

state. Pennsylvania during 1920 constructed 410 miles of permanent improvement, but had, during the year, twice the mileage under contract that Illinois had. A statement by the Illinois State Highway Department can well be quoted here as indicative of the problems necessarily faced by every state which attempted to carry through a program of permanent highway construction the past year.

"The completion of 341 miles of durable road during the year is more than we anticipated could be built when we faced the car shortage and rulings of the Interstate Commerce Commission early in the season. The effort put forth by the Department and the contractors could easily have built double the mileage if conditions had been favorable. At the beginning of the season there were approximately 100 paving machines on the ground, set up and 'ready to go,' only waiting for the material to be delivered. Not more than 53 of these equipments were used at any one time during the season, and the average throughout the season was considerably under that number. This situation should indicate, as previously stated, that double the amount of work could have been accomplished if the railroads could have transported the necessary amount of material."

Work in Iowa, Nebraska and Wyoming

Iowa during 1920 invested about twice as much on the improvement of the Lincoln Highway as it did during 1919. Furthermore, the state's investment in Lincoln Highway improvement during 1920 ex-



ONE OF THE OLD MACADAM STRETCHES OF THE LINCOLN HIGHWAY IN LAKE COUNTY, IND.

ceeded that of any year in the past. The country traversed by the Lincoln Highway in Iowa is rolling, and before permanent paving could be started it was necessary to provide a proper grade across the state. The providing of this grade cannot be looked upon as anything but permanent improvement, as the funds invested, now aggregating over a million dollars, spent in cutting down the hills and filling up the hollows, have all gone into a form of work essential to ultimate pavement which need never again be done.

On January 1, 1920, the entire Lincoln Highway from Omaha to the Wyoming line near Cheyenne, a trans-state distance of 470 miles, was taken over by the state of Nebraska as a portion of the established state highway system upon which will be concentrated the Federal Aid and state funds. A systematic maintenance system was also inaugurated to keep the route in the best condition possible pending permanent improvement.

Nebraska during 1920 completed 70 miles of new construction at a total cost of \$213,288. This included 16 miles of graveling at a cost of \$63,185, and 5.4 miles of concrete construction. The total cost for new state construction amounted to \$462,000, to which must be added the permanent improvement in Douglass County, in which Omaha is located, 5.4 miles of brick having been built



WITH THE COMPLETION OF A PERMANENT GRADE, AS SHOWN ABOVE, IN POTTAWATTAMIE COUNTY, IOWA'S SECTION WILL BE READY FOR PAVING



A CLOSE-UP OF ONE OF THE PERMANENT LINCOLN HIGHWAY MARKERS AFFIXED TO HARDWOOD POSTS, WHICH WERE PLACED ALONG 1,300 MILES OF THE TRANSCONTINENTAL ROAD IN 1920

leading west from that city, at a cost of over \$275,000, increasing the total investment in Lincoln Way improvement to \$737,000. The maintenance system, which was carried on intensively on 267 miles of the route, cost the state \$53,400, a total expenditure considerably higher than that of any previous year.

The length of the Lincoln Highway traversing Wyoming in the shortest and most direct line is over 425 miles. A very large proportion of the land area, over 75 per cent, is owned by the Federal Government, and from this vast empire of public land the state derives no revenue. In view of all these conditions and despite the fact

that Wyoming is one of the most sparsely populated states in the Union, it has embarked upon a program of highway improvement very ambitious in its extent. Until 1918 Wyoming's road funds were very meager, but the passage of a \$2,800,000 bond issue for good roads, the Federal Aid allowed to the state, and an increasing revenue devoted to roads, coming from oil leases on state land, has put the state in a position to undertake a very comprehensive program.

The standard specifications for new Lincoln Highway work in Wyoming are: 24 feet of grade, graveled surface, 16 feet wide, with an average thickness of 5 inches; all drainage structures of corrugated iron or reinforced concrete; bridges of reinforced concrete to carry a load of 20 tons.

Utah and Nevada

Utah during 1920 suffered severely from the general conditions hampering highway improvement, but particularly from an inability to sell its road bonds. Much new improvement work was accomplished, however, particularly between Salt Lake City and the Wyoming line, where one of the most scenic roads of the country, known as the Skyline Boulevard, leading down into Salt Lake City, has been completed, and where work was still under way at the end of the year on a project comprising 16 miles of new, high-grade, side-hill mountain road, through Parley's Canyon.

Nevada, like Wyoming and Utah and many other western states, labors under the greatest of difficulties in endeavoring



SUBSTANTIAL NEW BRIDGES ARE REPLACING THE OLD DILAPIDATED STRUCTURES. OLD AND NEW BRIDGES IN LINN COUNTY NEAR CEDAR RAPIDS, IA.

to provide acceptable highway conditions. Some 90 per cent of the land area of Nevada, a state half the size of France, is still owned by the Federal Government. The state has less than 80,000 population, and the local need for roads is restricted, while on the other hand the national need for connecting roads across Nevada, leading to the Pacific Coast, is vital to through transportation.

California's Contributions

It is 240 miles across the state of California on the Lincoln Highway from the Nevada line to the Golden Gate. California has long led all the states traversed by the the Lincoln Highway, from the standpoint of permanent improvement accomplished on the route in proportion to the state's mileage. For 60 miles from the Nevada state line to Placerville the mountain road is unpaved, but, being cut out of the rock of the Sierras, presents an all-weather surface, which, under the careful maintenance system of the California State Highway Department, presents at all times excellent driving conditions. From Placerville to San Francisco the route is paved with concrete.

Transcontinental Road Marking Completed

Following with modifications the plan of marking done along that section of the Lincoln Highway from Omaha to the Pacific Coast which has been marked in permanent fashion in coöperation with the Automobile Club of Southern California and the California State Automobile Association, work was undertaken and the permanent marking of the road from the east as far west as Omaha was completed in 1920. A road crew of seven men with two specially equipped motor trucks and a passenger car were engaged in this work from July until November 15. Three thousand enameled steel markers were erected between the Delaware River and the Missouri River. The markers, one of which is shown on page 109, are attractive and durable, 8 by 21 inches in size, and are firmly screwed to 4 x 4 chestnut posts, painted white and so located as to avoid confusion and obviate the necessity of asking directions at any point.

The permanent marking work was made possible through the financial assistance of one of the directors of the Association.

Including the cost of manufacturing poles and markers, the purchase of paint, tools and equipment, salary, railroad fare for the men employed, to and from the work, freight and other incidental expenses, the total expenditure for the permanent marking work amounted to \$30,000, or approximately \$10 for each completed marker in place. Of this sum, in addition to the fund contributed by Mr. Willys, a return of approximately \$5,000 was received from the communities along the route marked. From \$25 to \$300 was raised in each of the villages, towns and cities located on the Lincoln Highway between Trenton, N. J., and Omaha, the total fund required being prorated in accordance with the mileage to be marked in each county and the population of the communities. The remainder of the cost was borne by the Autocar Company in the equipment and maintenance of its trucks while engaged upon this work, depreciation, salaries of employes and railroad fares.

The Ideal Section

The Ideal Section is to be a relatively short stretch of highway so located as to be easy of access from all parts of the country for the purpose of inspection, and placed also where it will carry a representative and diversified traffic in the course of coming years. It will be designed to carry an average traffic of 15,000 passenger cars, traveling at 35 miles per hour, and 5,000 motor trucks traveling at 10 miles per hour per 24-hour day.

The Committee has agreed on a 40-foot concrete paving with reinforcing steel imbedded, 10 inches thick, and laid in a continuous slab without central subdivisions. Forty feet of paving width permits four lanes of travel, a lane for slow-moving trucks and a lane for rapidly moving passenger vehicles in each direction. In planning the thickness the Committee did not assume much greater weight on four wheels than as allowed by the several states at the present time, namely, 28,000 pounds.

It was decided that the dangerous open ditch at present found along the greater portion of our country roads should be done away with. The section would be drained by catch-basins and submerged tile under the earth shoulders, so there will be no danger of crowding into the ditch. The other dangers of present roads result

from three conditions: first, unnecessary and narrow radius curves, frequently insufficiently banked or super-elevated; second, from darkness and glaring headlights, and third, from pedestrianism. The ideal road will have no curves of less than 1,000 feet and they will be super-elevated only sufficiently to allow for a speed of 35 miles

per hour. Lighting is to be provided for the route to permit of the use of dimmers in the open country, and a footpath is to be furnished for pedestrians.

Advertising signs along the ideal section will be tabooed, and there will be no unsightly wires, as they will all be run underground in conduits.

A Cottage-Type Fire Station

Portland, Ore., Produces Attractive Structure for Residence Districts

By H. M. White

A COTTAGE type of fire station is the latest innovation in the Fire Department of the city of Portland, Ore. The new station, designed for residence districts, has just been completed in

living-room with a fireplace, built-in furniture, and the alarm equipment. To the rear is the dormitory, with shower-baths, etc., which connects with the apparatus room. The doors to the apparatus room are so de-



A FIRE STATION IN THE RESIDENTIAL SECTION OF PORTLAND, ORE., SHOWING NOVEL DOOR CLOSED AT LEFT AND OPEN AT RIGHT

the Sellwood district of Portland at a cost of \$10,500. It was designed by Lee Holden, a battalion chief in the Fire Department.

The building is made to resemble a modern cottage of brick and concrete and cement plaster. On the main floor is a large

signed that when closed they bear the appearance of a well of the building with two windows, flower boxes, etc. When the doors are closed they have no appearance of being doors. To a passer-by the new station looks like a residence.

A Water-Supply for Fire Protection

Another fire demonstration that owners of any buildings located near lakes or rivers and where municipal fire protection may be available, should provide a solid location for fire engines, took place near Raleigh, N. C., April 12, 1921. The Carolina Country Club, located near that city, was completely destroyed by fire, the blaze probably starting from a defective kitchen flue. Golfers on the course of the club reached the fire when the roof was already falling in. A response of the Raleigh Fire Department might have been of great assistance, for the department had 1,200 feet of hose laid

within six minutes after receiving the alarm, but it was impossible to place the pumping engine near the lake to draw water because of the muddy condition of the ground. As there was no other water-supply available, the firemen could only assist members of the club in carrying out some of the furniture. Inspection blanks for examination of structures of this kind should contain a question calling attention to the facilities for using whatever water-supply there may be available near-by.

—Fire Protection.

Progress in Color Standardization for Motor Traffic Control

By Jaques Hazelton Smith

RED, yellow and green are rapidly coming into their own in the field of traffic signaling. They have long been recognized by the railroads, and now, through a movement started only last year, these three colors are becoming familiar objects to the great number of motor car drivers throughout the United States. To be sure, these three colors have long been in use in the field of street and highway traffic signaling, but there has been a somewhat deplorable lack of standardization in their use.

There are many instances where, for example, red is used for one purpose in one city, and for an entirely different purpose in another city. In one of his recent tales of "Another Town," E. W. Howe, of Emporia, Kans., tells of an accident which came to a friend, a doctor, through a confusing use of the color red. The Doctor, it seems, was at a party, and left in his car to go in search of watermelons. From that point on, Mr. Howe writes: "Suddenly ahead of him, in the dark, loomed up a red light. Nothing makes the Doctor so impatient as a car ahead of him, and when he saw the red light he thought it was the tail light of a car, and made a dash to go around it. The red light turned out to be a lantern to give warning that a bridge was out. He went into the creek at 60 miles an hour."

For some time, in various other parts of the country as well as in Kansas, few people have been able to tell the exact meaning of red at any given point in the road. It was with a view to clearing up this confusion that the Committee on Standards of the American Association of State Highway Officials last December, in Washington, recommended a standardized use for color signals for our national highways. Something along the same line had already been undertaken by the National Safety Council at Milwaukee, but it remained for the State Highway Officials to go on record in favor of the use of red, yellow and green as used by the railroad systems of the country.

The Committee on Standards of the

American Association made the following recommendation:

Red—Indicating first degree danger, to be used only at railroad crossings, dead end of roads, or lift bridges. All traffic to stop, and proceed only when nature of passing the danger or of overcoming it has been ascertained.

Yellow—Indicating second degree danger, at curves and grades; yellow would indicate a danger where the driver must slow down and proceed with caution.

Green—Indicating moving or traffic danger only, and to be used at road intersections.

More than 200 cities have already adopted the color standardization recommended by the American Association. There are also several other national associations which have expressed their endorsement of the move for color standardization, among which may be named: American Automobile Association, American Electric Railway Association, American Railroad Association, Automobile Club of Southern California, California State Automobile Association, Council of National Defense, Federal Highway Council, International Association of Chiefs of Police, Motor and Accessory Manufacturers' Association, National Association of Automotive Mutual Insurance Companies, National Association of Brotherhoods of Threshermen, National Automobile Chamber of Commerce, National Automobile Dealers' Association, National Automobile Underwriters' Conference, National Highway Traffic Association, National Implement and Vehicle Association, National Safety Council, National Workmen's Compensation Service Bureau, Rubber Association of America, Tractor and Thresher Department of the National Implement and Vehicle Association, and The Trailer Manufacturers' Association of America.

In this connection it is interesting to know that one of the leading American companies supplying flashing traffic beacons to the cities and towns, is declining to furnish beacons where cities and towns refuse to conform to the color recommendation of the American Association of State Highway Officials.

Steam Boilers and Water Softeners for Municipal Power-Plants*

Part I

By W. F. Schaphorst, M. E.

IT would be difficult to give the exact reason why more attention is usually given to the selection of steam turbines, steam engines, gas engines, etc., for municipal power-plants than to the selection of steam boilers. Perhaps it is because the prime mover is more "showy"—more "spectacular." The idea seems to prevail that one boiler is about as good as another, and the selection is made on a mere price basis.

It is well to remember, though, that all of the good, expensive fuel is consumed in the boiler room beneath the boilers. The cost of fuel is usually the principal cost of power production. Roughly, the cost of generating steam in the typical municipal plant varies from 65 to 80 per cent of the total power-production cost.

The prime movers have also been getting more attention from inventors and designers than boilers. Most of the changes and improvements in the last twenty years have been made in prime movers, the boilers remaining practically the same, aside from size. Equal or even greater consideration should be given to the selection of the steam boiler, however, because the boiler is often responsible for the greatest waste.

Boiler Efficiency Can Be Maintained

The boiler, for example, is subject to greater difference in efficiency during its life. When new and when first tested, it usually performs very well, because it is clean and because it is carefully fired and watched. After a time, however, the inside becomes covered with scale and the outside with soot, the fireman becomes careless and does not regulate his air properly, air is permitted to leak through cracks in the boiler setting, fuel is improperly fired, and the net result is—a decided reduction in efficiency. This reduction is regarded by many as a perfectly natural result of age and it is permitted to continue. As a matter of fact, however, there is no reason why

boiler surfaces, both inside and out, cannot be kept clean throughout the entire life of the boiler, and why the efficiency cannot be maintained as high ten years after installation as it is on the first day of installation.

In most cities municipal authorities demand a strict accounting of all money spent in the various city departments. For example, if a thousand dollars is appropriated for digging a ditch and buying and laying pipe, every dollar spent must be accounted for. But in the power-plant a thousand dollars is appropriated for fuel and nothing is said after it is burned. It is simply charged to "fuel." Another thousand dollars is appropriated for more coal and so forth. Much money could be saved if more attention were given to boiler efficiencies—to the useful work that is gotten out of steam. What percentage of the heat value of the fuel goes into the steam? What percentage of the hot chimney gases is recovered and returned to the boiler? What percentage of the heat in the exhaust steam is recovered and returned in the form of hot feed water? What percentage is unnecessarily wasted in the ash pit?

Among the causes of low boiler efficiency we have the following, that are possibly not so important as soot and scale, but are nevertheless important:

1. Too much air is supplied to the burning fuel.
2. Insufficient air is supplied.
3. Not enough combustion space above the fuel bed.
4. Boiler settings are allowed to become leaky.
5. The best coal or fuel for the given conditions is not used.
6. Improper grates are used.
7. Fuel is fired haphazardly, unsystematically.

Safety the Greatest Essential

In selecting a boiler for any purpose whatever, the most important requirement of all is to select one that is safe. In gen-

eral, the water tube boiler is safer than the fire tube boiler because the former does not store so much water. The late Dr. Robert H. Thurston, Dean of Sibley College, Cornell University, figured that in a plain cylindrical boiler under 100 pounds steam pressure enough energy is stored to throw the boiler to a height of over three and one-half miles in case of an explosion. This is because hot water contains so much energy and because there is so much water in cylindrical boilers. He said: "A cubic foot of heated water under a pressure of from 60 to 70 pounds per square inch has about the same energy as one pound of gunpowder." This is one of the reasons why the water tube boiler is given preference to the fire tube boiler.

The weight of the boiler also is important. Fire tube boilers are generally large in diameter. The greater the diameter, the greater must be the thickness of the metal to withstand the given pressure, and consequently the greater the weight of steel necessary and the greater the cost. The water tube boiler, again, has the advantage in that the drums of water tube boilers seldom exceed 48 inches in diameter; hence the plate thickness is never excessive.

The tubes of the water tube boiler always come in contact with the most intense heat. However, since these tubes are comparatively small in diameter and of great strength, they have a high factor of safety, much higher than the usual factor of safety of a fire tube boiler, the thick shell of which is exposed to the most intense heat.

Also, in the water tube boiler there are no compressive stresses whatever. Pressures always act from within, both in the drums and in the tubes, consequently all metal is in tension. In the fire tube boiler the tubes are in compression and are always liable to collapse, especially when they become thin or when made in large diameters.

While it is true that water tube boilers sometimes explode, such explosions are almost invariably less dangerous than fire tube boiler explosions. Water tube boiler explosions due to weak drums seldom occur, because the drums are well protected from intense heat. If there is any breaking or bursting at all, it is usually a tube, and tube failures are seldom serious. Dr. Thurston said:

"The stored available energy is usually less

than that of any of the other stationary boilers and not very far from the amount stored, pound for pound, in the plain tubular boiler. It is evident that their admitted safety from destructive explosion does not come from this relation, however, but from the division of the contents into small portions, and especially from those details of construction which make it tolerably certain that any rupture shall be local. A violent explosion can only come from the general disruption of a boiler and the liberation at once of large masses of steam and water."

Economy of Operation

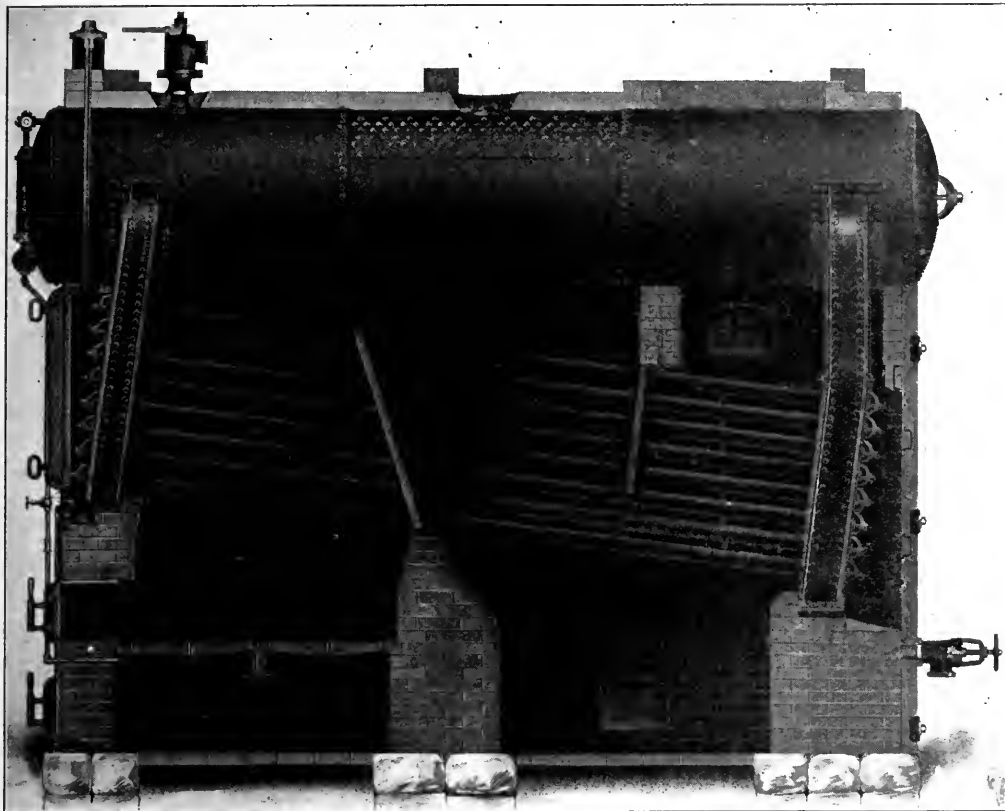
Next in importance to safety comes economy of performance. A great many different designs of boilers have been built, and many of them have proved successful. There are many makes of boilers on the market to-day, most of which can be called successful. Some of them are water tube and some of them fire tube boilers. As far as economy of operation is concerned, there seems to be no line of demarcation, as one type of boiler generates as many pounds of steam per pound of coal as the other, provided conditions are right as to cleanliness, amount of fuel burned per square foot of grate area, amount of air used per pound of fuel, tightness of boiler settings, etc. It is true that the water tube boiler is usually regarded as the more efficient of the two general types, as it has many good records to its credit. However, this excellent performance is probably due to the largeness of the boiler used in the test rather than to the particular design. Large units are usually more efficient than small units.

Greater rates of evaporation are possible from water tube boilers than from fire tube boilers; consequently it is easier to force the water tube type.

Water tube boilers can be started more quickly than fire tube boilers because the water tube type contains less water.

All parts of a boiler should be easily accessible, so that they can be cleaned, inspected and repaired without great cost. Water tube boilers, again, have the advantage in that they are usually more easily cleaned, both of scale and of soot, are more easily inspected, and can be more easily repaired.

The water tube boiler requires less floor space than horizontal tubular boilers. According to information published by one of the foremost manufacturers of water tube



Courtesy Oil City Boiler Works, Oil City, Pa.

A WATER TUBE BOILER WITH VERTICAL BAFFLES FOR HAND FIRING

boilers, an average 100-h.p., horizontal tubular boiler requires 40 per cent more floor space than an equal capacity water tube boiler, and a 300-h.p., horizontal tubular boiler requires nearly 50 per cent more floor space than an equal capacity water tube boiler.

The water tube boiler also lends itself more readily to theoretical design than does the fire tube boiler. In the fire tube boiler we have a fixed cross-sectional flue area from one end of the boiler to the other. Theoretically, this area should gradually decrease with the reduction in volume of the flue gases, as these gases become cooler in imparting heat to the boiler while passing through the boiler passes. In the fire tube boiler this cannot be done without excessive cost. In the water tube boiler, however, this reduction in volume of gases is easily cared for by a simple adjustment of the baffles.

Summing up, we have these principal advantages of the water tube type:

1. Lightness
2. Strength; greater safety
3. Compactness; less floor space required
4. Adaptability for use with forced draft
5. Rapidity with which steam can be raised from cold water
6. Higher rate of evaporation
7. Accessibility for cleaning, repairing, etc.
8. Adaptability to theoretically correct baffling

But, on the other hand, we must likewise weigh the disadvantages of the water tube type, among which are the following:

1. It is not so easy to obtain proper circulation of water through the tubes. Sometimes tubes burn out because of poor circulation.
2. It is more difficult to separate the steam from the water without carrying moisture along.
3. There is less steam disengaging surface.
4. There are many more joints to give trouble by leaking than in fire tube boilers.
5. A great many hand holes are needed for cleaning the tubes, thus increasing the number of joints still more.
6. Fluctuations in pressure occur more eas-

ily than in the fire tube boiler. Drums should be large enough to insure ample water-supply. If they are too small, the water-supply may become exhausted quickly, and the water level will drop below the upper tube. There is danger involved in permitting the level to become too low.

It is the practice of some boiler manufacturers to baffle the boiler tubes either way, vertically or horizontally, depending upon the kind of coal used. For Eastern coal the boilers are baffled vertically, so that the gases will pass across the tubes. For other grades of fuel, or to meet special furnace conditions, the boilers are baffled horizontally, directing the gases toward the rear of the boilers, then forward through the bank of tubes, then again to the rear of the boiler to the smoke outlet. Sometimes, to meet special conditions, boilers are baffled with a combination of vertical and horizontal baffles.

When selecting a boiler, it might be well to bear in mind that, according to investigations of the U. S. Bureau of Mines, gas passages in steam boilers should be long with a small cross-section. Such boilers are more efficient than those having large cross-sections and short passages. Also, there should be as little free area as possible between tubes. By reducing this area, the hot gases are forced into more intimate contact with the tubes than where the spaces are ample.

For smokeless combustion, horizontal baffles are preferable. If vertically baffled boilers are to be used without developing smoke, the boiler settings should be very high. In cities having stringent smoke ordinances, vertically baffled boilers are not allowed, especially with bituminous coal and hand firing.

The horizontally baffled boiler is also preferable from the draft-loss viewpoint. Less chimney draft is required to draw the gases through than with vertically baffled boilers. Tests were made by Henry Kreisinger and M. T. Ray proving the horizontally baffled boiler to be superior from the draft viewpoint.

As for chimney temperatures (low chimney temperatures, remember, are always most desirable), vertical baffles are less desirable, because with them when operating at full load a temperature of 550 degrees F. was obtained, whereas with horizontal baffles the temperature was only 470. When

operating 50 per cent overload, the temperatures were 660 degrees F. and 570 degrees F. respectively for vertically and horizontally baffled boilers. In these tests by Kreisinger and Ray, vertical baffling was first used and efficiencies of 61.3 and 60.9 per cent were obtained with Pocahontas and Clinchfield coals respectively. Using horizontal baffling equipped with two horizontal passes, the efficiency was raised to 63.6 and 67.2 per cent with Pocahontas and Clinchfield coals respectively. With three horizontal passes, the efficiency was still further increased to 67.7 and 69.9 per cent, using Pocahontas and Clinchfield coals respectively. Horizontally baffled boilers are superior for high volatile coal.

It is not so difficult to keep horizontal baffles tight against leakage as vertical baffles. Horizontal baffles are much more easily installed and kept tight. Tightness is essential.

Radiant Heat

In selecting a steam boiler and in the design of the settings, it is also well to remember that radiant heat is a valuable item. The furnace walls and all exposed boiler surfaces receive radiant energy from the glowing fuel-bed. The fire brick furnace walls are poor conductors of heat, and therefore they become incandescent. This incandescence is of value to the boiler because of the re-radiation of heat that takes place from it. Boiler surfaces that completely envelop the furnace, as in the locomotive type of boiler, are preferable from the radiant heat viewpoint, but their expense eliminates them from stationary power-plants. Boiler surfaces should always be so placed that the maximum surface is exposed to the glowing fuel-bed. Examples are cited where fire brick arches have been built over the fires to "improve" the furnace, but the results were disappointing. Lower efficiencies were obtained in place of higher. As soon as these arches were removed, exposing as much of the boiler surface as possible to the glowing fuel-bed, the higher efficiencies were again restored.

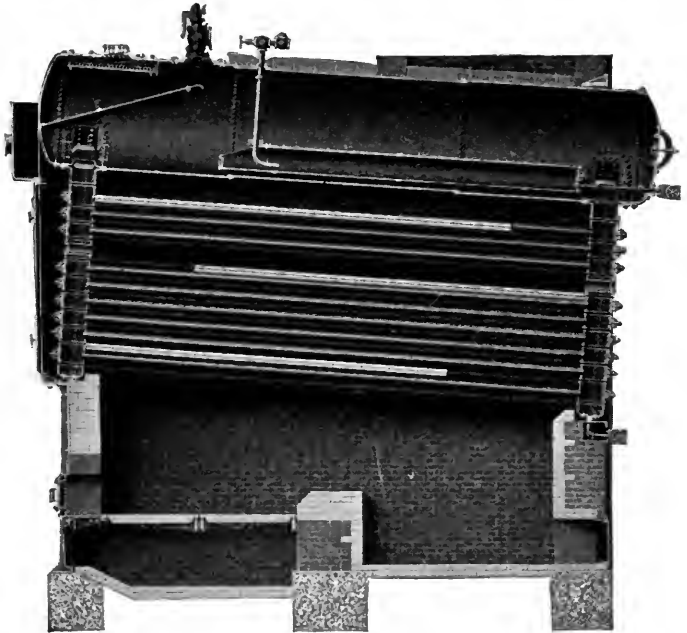
In order that there shall be no interference in the absorption of this radiant heat, it is important that the boiler surfaces be clean and free from ash and soot. It is also important that the highest possible fuel-bed temperature be maintained, because radiant

energy transmitted varies, not directly with the temperature, but as the fourth power of the absolute temperature. That is, it varies as the fourth power of the absolute temperature of the fuel-bed minus the fourth power of the absolute temperature of the boiler surface. The fuel-bed, too, should be clean as well as hot, as any ash or clinker would intercept the radiant rays between the bed and the boiler surface.

The Overload Capacity

The problem of best boiler operation in the average municipal power-station is not as simple a matter as it may seem on the surface. For example, the question almost invariably arises: Shall we operate our boilers at their rated capacity, or shall we overload them? It is possible to greatly overload boilers. Some central stations make it a practice to operate boilers at 150 to 200 per cent of their rating. In other words, a 100-h.p. boiler is compelled to develop 150 or even 200 h.p. Although this is done with the sacrifice of maximum efficiency, it is often more economical, because the first cost of the installation is virtually cut in half, especially if the power-plant load is a variable load. If the load is constant, it is usually more economical to operate at normal load or at slight overload. Much depends upon the size of the plant and the nature of the load: consequently it is practically impossible to write out a definite statement as to the most economical load for a new plant or even for an old plant. Each plant must be given its own individual consideration. The load curve of the plant must be carefully studied in determining the most economical boiler load combination.

In view of the above, it is clear that the overload capacity of a boiler is an important item. Where the load is very irregular, as is usually the case in municipal power-



Courtesy Heine Safety Boiler Co., St. Louis, Mo.

A TYPICAL WATER TUBE BOILER EQUIPPED WITH HORIZONTAL BAFFLES AND ARRANGED FOR HAND FIRING

plants, the water tube boiler, which can be made to handle sudden overload quickly, is ordinarily preferable. It is more economical in most installations, for example, to have a single boiler handle loads varying from 100 per cent to 200 per cent, than to have two boilers, one of them operating constantly at 100 per cent and the other boiler operating from zero load to 100 per cent. A boiler operating at zero load, or nearly zero, is indeed a wasteful device, especially if coal is used for fuel.

The skill and intelligence of the engineer and his firemen naturally have much to do with the maintenance of continuously high efficiency. High grade engineers and firemen usually command more pay than inferior men, but in municipal power-plants, where considerable fuel is usually burned every year, it pays to employ only high grade men. The larger plants can of course afford to pay more than the smaller plants, because of the greater amount of fuel consumed and the greater annual saving due to the more intelligent operation. However, poorly paid supervision and labor in the municipal power-plant is usually expensive.

The Bridges of Fort Wayne, Ind.

The Consolidation of City and County Organizations Helps in Building Bridges
at the Confluence of Three Rivers

By Robert A. Reed

ALMOST in the heart of the city of Fort Wayne, Ind., three rivers meet.

Through many sections of the city the St. Joe, Maumee and St. Mary's Rivers wend their way, making necessary the erection of a large number of bridges. It is doubtful if there is another city in the United States of the same size which has the number of bridges that exist in Fort Wayne. Fort Wayne's bridge building has attracted attention from municipalities all over the country. During the last ten years Allen County and the city of Fort Wayne have embarked upon a progressive program of bridge building that has resulted in the erection of some of the finest modern concrete bridges in the Middle West.

The three rivers of the city are spanned by fifteen large, modern bridges, six of which are of concrete construction, and the others of steel. The concrete bridges in the city are the Clinton Street, Tennessee Avenue, Harrison Street, Coombs Street, State Boulevard, and the West Main Street, now in process of construction. The steel bridges in the city are rapidly being replaced by the new and more modern concrete bridges, but the steel bridges are nevertheless a credit to the city. The nine steel bridges are the Walton Avenue, Lakeside, Spy Run, Wells, Van Buren, Taylor, Hale, Broadway and Swinney Park.

The bridge-building program has been accomplished at a cost of nearly a million dollars. This sum represents only the amount expended on city bridges, for the bridges in the county outside the city have cost thousands more. The six concrete bridges in the city represent an outlay of \$474,000, and the steel bridges have been erected at costs varying from \$25,000 to \$60,000 each.

The work of bridge building in both city and county is under the jurisdiction of the county and is in charge of the county surveyor. The present surveyor, Asa W. Grosvenor, has designed all the new concrete bridges except the Coombs Street and the Clinton Street. Allen County is at present

doing more work on bridges and roads than any other county in the state.

Some of the Most Notable of the Fifteen Bridges

The past year marked a great step in bridge building in Fort Wayne, when construction was started on the West Main Street bridge, which is to be the largest and most costly in the entire city. It will be completed during the present year and will represent an expenditure of \$155,000. It will consist of three spans, the center span being 95 feet in length, and the two end spans 90 feet. It will be 40 feet between curbs, with double street car tracks and two 7-foot sidewalks. It will be 80 feet longer than the old steel bridge which it will replace.

The new West Main Street bridge will be an engineering achievement. Every pile in its foundation is being driven with the utmost care, since each will sustain a weight of 22½ tons. The abutments of the old West Main Street bridge, placed in position by the Herman Tapp Construction Company at the time of construction, are to be used in the new bridge, not for the purpose which they formerly served, but as strengthening material. Blocks weighing as much as a ton and a half, after being carefully cleaned, are dropped into the mass of concrete mixture.

Second in cost among the Fort Wayne bridges is that at State Boulevard, completed in 1919 at a cost of \$95,000. This is a three-span bridge, the center being 90 feet, and the two end spans 95 feet. One new feature which was introduced in the building of the State Boulevard bridge was the use of the ornamental lighting poles as supports for the cross-wires which support the trolley wires. This has made unnecessary the use of extra poles on the bridge, which do not usually add to the beauty of such a structure. The old steel bridge which was replaced by this modern concrete structure has been placed in Swinney Park. New



A FEW OF THE FIFTEEN BRIDGES OF FORT WAYNE, IND.

Left—Harrison Street Bridge on the Lincoln Highway. Right—Tennessee Avenue Bridge, considered by many to be the most beautiful in the city. Below—Bridge at the entrance to Lakeside, where the three rivers meet. This steel bridge is soon to be replaced by a more ornamental concrete structure

abutments were built, and with a new floor which has been laid it will give service for many years.

Probably the first in point of beauty of Fort Wayne's bridges is that over the St. Mary's River at Harrison Street. The Harrison Street bridge has attracted favorable comment from hundreds of visitors in the city. It is a modern concrete structure, 136 feet in length, completed in 1914 at a cost of \$80,000.

One of the earliest concrete bridges in the city is that spanning the St. Mary's River at Clinton Street. This bridge was completed in 1907 at a cost of \$29,000. It has two spans, each 105 feet long. The remaining concrete bridges, the Tennessee Avenue and the Coombs Street, were completed in 1911 and 1912, respectively, the former at a cost of \$45,000, and the latter at \$70,000.

Although the six concrete bridges of the city have all been built since 1907, Fort Wayne has always been active in bridge building, partly from necessity, because of its position at the junction of three rivers, and partly through civic pride and progress. Back in 1891, a board of county commis-

sioners went into office which built 103 bridges throughout the county in six years. J. H. Stellhorn, now the only surviving member of these commissioners, tells interesting stories of bridge building in the early days.

The bridges now being built in Fort Wayne are being constructed with many considerations in view, and with the expectation that they will last for many years. The concrete is reinforced by the use of steel girders, and steel lacing bars are run diagonally through it. High waters are also taken into consideration, and in building the new bridges, flood conditions more severe than the city has ever met with are provided for.

Maintenance Provided for

Not only within the city of Fort Wayne has this community been progressive in the matter of bridge building, but throughout the entire county. Allen County leads the state not only in the number and quality of her bridges, but in the provisions that are constantly being made to keep them in the best of condition.

Liability as to Street Lighting

By Arthur L. H. Street

IS a municipality liable for personal injuries sustained by pedestrians and other travelers along public ways when these are attributable to failure of the city or town to establish or maintain lighting?

The expressed views of the appellate courts of the several states on this question are so divergent that it is impossible to give a direct answer that will fit every jurisdiction. The law on the subject seems to be still in the process of formation, so far as any general principle can be said to be established. Or, perhaps, it should be said that the law was once settled and that some one "riled it up" and it hasn't settled again.

Under the common law municipal lighting of streets was not required. That body of jurisprudence creates no right of action on the sole ground of a city's neglect to have a street lighted when an accident occurred. (28 Cyc. 1403.)

But the great weight of judicial authority in this country is to the effect that where existence of a defect or obstruction in a street or public way concurs with an unlighted condition at that place, liability of the municipality may be predicated on the want of light.

Other courts have stretched the exception to municipal non-liability in such cases by holding that a city may be held to be negligent where *from any cause* there is reasonable ground to foresee danger to travelers themselves in the exercise of due care. The courts of Pennsylvania, Texas and Colorado are among the tribunals which have adopted this attitude.

Perhaps one of the most persuasive opinions is that of the South Carolina Supreme Court in the case of *Sexton vs. City of Rock Hill*, 93 Southeastern Reporter, 180, where the Court sustained liability of defendant on a theory that neglect to keep an electric lamp at an intersection of streets was the cause of a collision between plaintiff's bicycle and an automobile. It was decided that, "considering the place and all the circumstances, a jury might reasonably infer that the city had failed to exercise ordinary care in the premises."

"It would be fruitless," said the Court, "to recite the many divergent conclusions

which the courts of the many states have reached about a city's liability for torts [wrongs] of the character which the instant case illustrates. When many of the decisions were made, there were no electric lamps capable of instant ignition over the total area of a city by the sudden movement of a lever; there were no bicycles; and there were no ponderous, perilous, and swift-moving cars driven by licensed and unlicensed persons, and propelled by their own engines along the country's highways, by day and by night. These circumstances might call for the lighting of much-traveled highways in thickly settled communities. Duties spring out of obligation and circumstance. The first is unchanging law, and the second is ever-changing facts. The failure to so light might under the circumstances render the way 'defective.'"

In the case of *Hill vs. City of Boston*, 121 Northeastern Reporter, 24, the Massa-

Officials Blamed For Woman's Death

Fell-Street Accident Is Sifted by Jury

A Coroner's jury holds the lighting committee of the Board of Supervisors responsible for the death of Margaret Reilly, 94 Carl street, who was struck by an automobile February 25 in Fell street on the north side of the Panhandle of Golden Gate Park, in a report filed yesterday with the Supervisors. The woman, who was 70 years old, died later at the Central Emergency Hospital from a crushed chest and other injuries.

The Coroner's jury exonerates the driver of the machine and states that the accident was due to improper lighting of the street, and that other juries have recommended to the lighting committee that the street be lighted, which recommendations have been ignored. The jury, therefore, charged the lighting committee with negligence, and holds it responsible for the woman's death.

chusetts Supreme Judicial Court's decision turned upon the difference between danger to travelers arising from a mere unlighted condition, and danger arising from the concealment of defects and obstructions by unlighted condition. There it was held that mere failure on the part of defendant city to maintain proper lights over a stairway leading to a subway, whereby plaintiff, misjudging that he was at the bottom of the flight, fell and was injured, gave no right of action. The Court says:

"There was no evidence of any defect or obstruction in the passageway or upon the stairway. . . .

"Whatever may be the measure of duty of a municipality to erect and maintain barriers and lights to warn and to guard against defects and obstructions in public ways, it is settled in this commonwealth that the mere failure to provide and maintain proper lights is not negligence, even if the way unlighted be dangerous."

One of the recent expressions on the subject is thus made by the West Virginia Supreme Court of Appeals in the case of *Holsberry vs. City of Elkins*, 103 South-eastern Reporter, 271:

"The lighting of its streets is a discretionary or governmental function, and a city is not liable for failure to light them, even though it may own its own plant for that purpose, *unless such lighting is necessary to warn travelers of some defect or obstruction in the street, or unless its charter or some general act of the Legislature imposes on it the duty to light them.* The mere power given it by charter to light its streets does not render a city liable for failure to exercise such power."

In the light of these divergent judicial views, municipal authorities are driven to the appellate court reports of their particular states for a guide to avoid possible legal liability. But, in view of the possibility, if not probability, of most of the courts finally coming over to the views expressed by the South Carolina Supreme Court, we believe that the safest and most humane guide for a city is the test whether, considering the volume of traffic at given points and all the surrounding circumstances, there is apparent danger that some one is apt to be killed or seriously injured unless lights are established and kept burning.

The Locomotive Crane in City Service

Flint, Mich., Operates Its Own Locomotive Crane in a Municipally Owned Yard

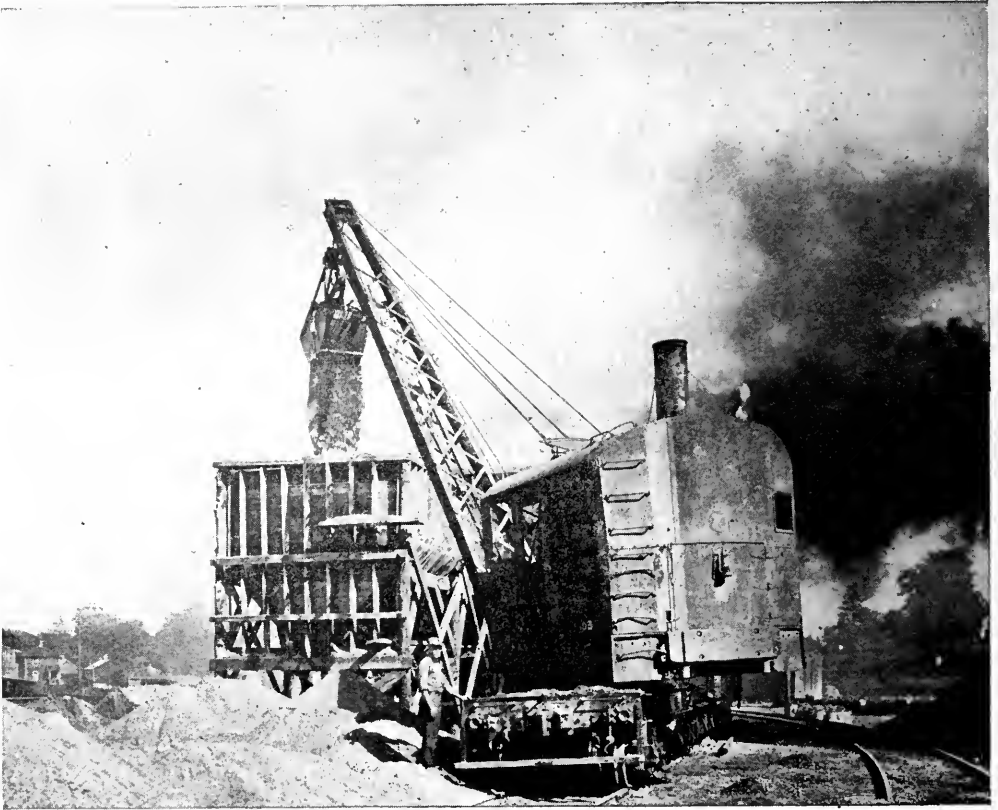
WHEN the city of Flint, Mich., found that the volume of material used in construction work was becoming too great to be handled by the local railroad yard, it decided to maintain a municipally

owned storage yard. In the spring of 1920, a 15-ton Industrial locomotive crane was purchased. The principal duty of this crane is the unloading of gondola cars containing gravel, washed sand, binder-stone and asphalt sand, all for the city's asphalt plant, and coal.

The crane is worked on two 10-hour shifts daily, according to E. C. Shoecraft, City Engineer, and unloads approximately 20 cars a day. In addition, the crane handles all the cars themselves, thus doing away with the need of a switch engine. It is the general opinion of the various members of the department that this locomotive crane has been a distinct money-saver for the city, not only in the actual handling of material but also on car demurrage.



BUILDING UP A MUNICIPAL COAL PILE



THIS LOCOMOTIVE CRANE, OWNED BY THE CITY OF FLINT, MICH., IS USED TO UNLOAD SAND, GRAVEL, STONE AND COAL FROM RAILROAD CARS AT THE MUNICIPAL YARD

The illustrations for this item, which were furnished through the courtesy of Industrial Works, Bay City, Mich., show two of the services to which this locomotive crane has been put; namely, unloading

gondola cars at the municipal coal yard, and the all-round service that a crane is called upon to give in the storage of materials for street or other municipal departments.

Sewage Disposal in the Country

A SYSTEM by which an isolated dwelling, or a small group of buildings, having running water may dispose of sewage safely and at small cost, is recommended by the U. S. Public Health Service in one of its recent weekly reports. The chief feature of the system, which has been in successful operation in New Hampshire for summer cottages and hotels for ten years, is a rectangular septic tank of concrete, with a minimum capacity of 94 feet. This will serve 20 people; 4 cubic feet additional should be provided for each additional person.

The tank should be buried under 12 to 18

inches of earth, as near as practicable to the house, with which it should be connected by piping. The effluent from this tank, which contains organic matter that might be objectionable and even dangerous, is commonly best disposed of by some sort of subsurface irrigation whose exact form will necessarily be governed by the nature of the soil. Full details are given in the report. Before installing such a system, however, the state health authorities should be consulted, especially in the limestone sections of the country, where care is necessary to prevent the contamination of springs and other underground waters.

Forward Steps in Municipal Affairs

Public Welfare Departments

Denver Gives More Thought to Music

DENVER, COLO.—One hundred thousand people actively participating in over three hundred musical events ranging from studio recitals to grand opera; thousands of people unable to gain admittance to the major events; a total cost to the citizens of Denver of less than 2 cents per capita, are the outstanding features of Denver's great Music Week, May 15-20.

Eight bands, twenty choruses and glee clubs, nine orchestras, nine schools of dancing, six quartettes, every public school, practically every church and pastor, all men's clubs and most of the women's clubs, libraries, six hundred music teachers, the City and County of Denver, practically every civic and social body and scores of other organizations, contributed to make the Week memorable in Denver's history.

The daily newspapers gave unlimited space to all programs. Two of the papers issued special 12-page editions on the Week. Over 12,000 inches of publicity were received, practically all of which appeared in the daily papers.

The concerts given in the City Audi-

torium attracted the greatest attention. When thrown wide open, the immense building accommodates over 12,000 people, and when converted into a theater seats approximately 4,000. At the opening concert by 3,000 school children on Sunday afternoon with the Auditorium wide open, it was estimated that fully 6,000 people could not gain admittance. During the 6 days there was a recorded attendance of 63,000 people at the building, with an estimated number from 20,000 to 25,000 turned away.

While the attendance at other places in the city where musical affairs were given could not, of course, equal the Auditorium crowds, the reports showed that splendid audiences greeted Denver's musical talent everywhere. The churches were filled to overflowing on the opening Sunday, when



Courtesy of Denver Times

ALL DENVER HAD A PART IN MUSIC WEEK

such compositions as "The Creation," Mendelssohn's "Hymn of Praise," Rossini's "Stabat Mater," Gaul's "Holy City," and other fine numbers were given.

Fifty-four thousand school children participated in daily concerts and in operettas in the public schools, and in addition furnished several of the major events in the Auditorium, notably a competition among the High School orchestras and glee clubs. The Municipal Chorus, numbering two hundred voices, gave the grand opera "Martha" four times to a total audience of 15,000. Fifty thousand song sheets were issued for free distribution by Denver Community Service to supply the demands for community singing.

All musical activities sponsored by the Music Week Committee were given free of cost. The incidental expenses were borne by the City and County of Denver, the public schools and private subscription.

The undertaking was organized and directed by Denver Community Service, and the great success of the Week, with its motto of "Give More Thought to Music," can be attributed to the careful and systematic manner in which every detail was planned and carried into effect.

F. H. TALBOT,
Director, Denver Community Service, Inc.

Police Departments

A Simple Plan for Suburban Police Protection

KENILWORTH, ILL.—During the last few months there have been so many robberies among the North Shore suburbs of Chicago that the village of Kenilworth has devised a novel plan for meeting the emergency.

A committee was organized to assist the Village Board. As a result of several conferences the following plan is now in operation:

Arrangements have been made by the Kenilworth, Wilmette and Winnetka police to coöperate when an emergency call is received. Each home in Kenilworth has been supplied with a police whistle. Two additional night patrolmen, armed with revolvers and riot guns, make the rounds of the village in a Ford car equipped with searchlights, so that every home is patrolled at least once each hour during the night. A third officer is continuously on duty at the depot watching incoming trains and cars and answering telephone calls, and in other ways coöperating with the patrolmen. As a further protection, the patrolmen carry a watchman's clock which gives a permanent record of the routes covered by them.

The expense of this added protection will amount to about \$4,500 a year. The raising of this amount by general taxation would be prohibitive, as out of each dollar raised by tax against property the village of Kenilworth would receive only 19 per cent, the remaining 81 per cent being distributed among other taxing bodies. In other words, to meet this added expense of \$4,500 by general taxation, it would have been necessary to raise at the same time \$18,000 for the other taxing bodies. The committee therefore recommended that the emergency be met by special assessment and that each householder be assessed annually an amount equal to \$2.50 for each room in his residence, with a minimum assessment of \$15. On a home of six rooms or less the tax is \$15; eight rooms, \$20; ten rooms, \$25.

It is believed that this plan of protection will be fully as satisfactory as the hiring of private watchmen, and, of course, it involves much less expense. It has been recommended that in each house at least one light be kept burning throughout the night, and that the police whistle be used vigorously in case of any disturbance.

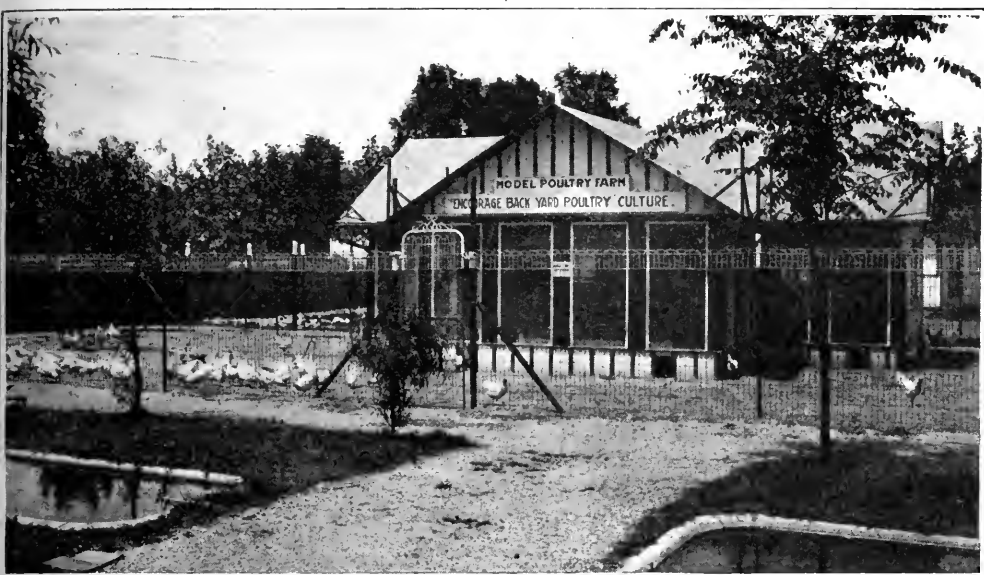
JOHN HICKS,
Chairman of Emergency Com.

Directions for Use of Police Whistle

1. To call police—ONE LONG BLAST. Policemen will answer in the same way. This signal should be repeated at half-minute intervals.
2. POLICE and FIRE PHONE — KENILWORTH 315.
3. Householdors should never use whistle unless reasonably certain that someone is committing a crime. If the circumstances are merely suspicious, use the telephone.
4. If many false calls occur it will be necessary to discontinue the system. Your co-operation is needed to make the system a success.
5. Policemen will call fellow police in emergency only, by sounding three sharp blasts. Householdors must not use the three blast signal.
6. The whistle is installed for your protection and is NOT to be used as a TOY.



A POLICE WHISTLE ATTACHED TO THIS TAG IS HUNG IN
EACH HOME IN KENILWORTH, ILL.



THE BIRMINGHAM MUNICIPAL CHICKEN FARM TEACHES CORRECT AND PRACTICAL METHODS

Park Departments

A City Teaches Chicken Raising

BIRMINGHAM, ALA.—A municipal poultry farm located in the largest city park in Birmingham has recently been established by the Board of City Commissioners for the instruction of people in the city who are interested in raising chickens, and to encourage them to use their back yards for this purpose.

If every family in Birmingham would raise 12 chickens during the summer months, feed them on scraps from the table and a small amount of regular chicken feed, and eat them for meat during the fall, the amount of money saved would run into thousands of dollars. Estimating that there are just 30,000 families in Birmingham—and there are many more—if each family raised 12 chickens, at a saving of 25 cents each, the total saving on market prices would be \$90,000 for the season.

The poultry farm is being operated under the direction of Miles Bradford, an expert on poultry culture, who gives instruction to all people who go to the farm and ask for it. A pamphlet setting forth

salient points in chicken raising is given to every visitor. Everything about the farm has been built in miniature of a large model farm to show that chicken culture can be carried out in city back yards successfully. There are at the present time 100 white Leghorn hens, 10 cockerels and 350 baby chicks.

The houses and runs are constructed according to the latest methods advocated by scientific chicken farmers, except that they are about one-fifth the size of the accommodations of the average large chicken farm. The baby-chick houses are a miracle of neatness and convenience. Enough space has been provided for 350 chicks, but it is so arranged that the "city-bred" chicken farmers can see how they could fix up a space for as small a number as 25. The hen-house has been fitted out with the newest innovations in the way of roosts and nests.

The chicken farm has been running in good order for some weeks, and in the first six weeks 3,000 pamphlets on chicken culture were given out. The City Commissioners have planned to have in another year a system of practical instruction at the farm for all persons interested in starting back-yard chicken farms.

J. ELLIS BROWN,
Commissioner.

Recreation Departments

Skating-Rink and Ball Ground

EAST ORANGE, N. J.—The Elmwood Park playground in East Orange has an area of 9 acres. Near the center of the plot is a



HERE EAST ORANGE CHILDREN SKATE IN WINTER AND—

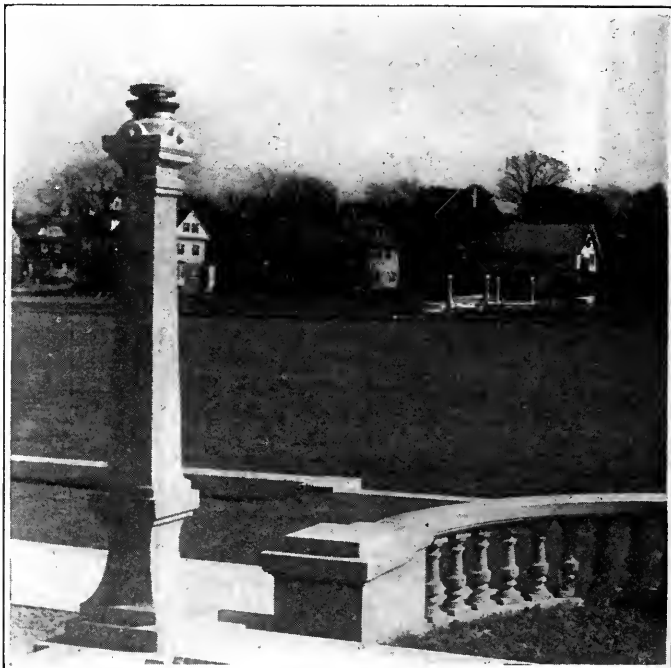
depressed oval-shaped section having an area of approximately 118,226 square feet (2.71 acres), which is used as a ball field in the summer and as a skating-rink in winter.

To accomplish the result of a sieve in summer and a basin in winter, the specifications provided for the construction of a concrete wall near the bottom of which is a reinforced tongue of concrete projecting on the inside and forming connection with the clay puddle. At the center of each side of the oval, sluice-pits and gates were constructed. Over the bottom of the entire oval was spread an 8-inch thick mat of clay,

which was thoroughly puddled. On the clay puddle cross-drainage channels were laid out across the oval every 32 feet, connecting with a similar channel which encircles the field at a distance of 2 feet 6 inches from the wall, in which was laid a 4-inch drain tile connecting with sluice-pits. The drainage channels were filled with coarse slag, and the area between these was filled in with ashes. Over the top of all this was

placed 12 inches of top soil. The surrounding curb is about 14 inches above this surface and is used as a seat by those watching games in summer, and for putting on skates in winter.

Around the depressed oval is a running-track 14 feet wide, outside of this a narrow grass plot, then a walk, and outside of that an ornamental concrete balustrade which may also be used as a seat for watching games. On this balustrade are concrete lamp-posts every 50



—PLAY TENNIS AND BASEBALL IN SUMMER

et, upon which flood-lights are used in winter.

There are seven tennis courts on the playground, three of which have a lighting equipment so that they may be used at night.

The cost of the improvement of the playground (over \$125,000) has been met by one of the city's public-spirited residents, Elden Freeman, who made this gift in memory of his father, Joel Francis Freeman.

LINCOLN E. ROWLEY,

Secretary, Board of Recreation Commission.

City Planning Commissions

Effective Publicity Aids Cleveland City Plan

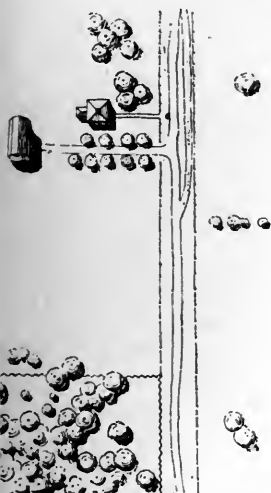
CLEVELAND, OHIO.—The City Plan Commission of Cleveland is about to release a one plan for public criticism and hearings. It is keenly cognizant of the fact that such

a project demands intensive, persistent publicity in the metropolitan district, and is endeavoring to apprise the mass of the people of the value of planning for the city's growth.

A brief, general statement relative to city planning in the city of Cleveland during 1920 is included in "The People's Business," a pamphlet describing the work of all city departments, issued by the Municipal Bureau of Information and Research early in 1921. An edition of 100,000 copies, now exhausted, was distributed to property owners listed by the City Water Department. A limited number of copies was sent to the principal public libraries of the country for reference use. A city planning section is also included in the "Cleveland Year Book for 1921," published by the Cleveland Foundation. This is the first of a series of annual summaries of events and progress in Cleveland.

Illustrated lectures on city planning have been given, upon every possible occasion, before all the civic organizations, a few of

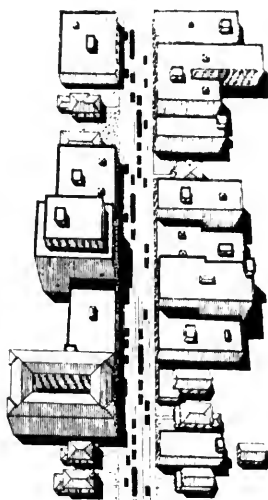
When is it Cheapest to Widen the Street?
When like this? or this? or this?



The country road can be widened at the time the adjacent land is cut up into building lots almost without cost.



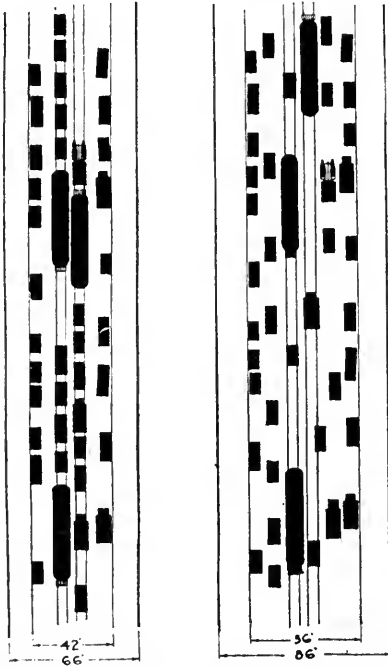
Failing this a building line may be established that will secure its eventual widening when the residences are replaced by stores.



When largely built up with expensive commercial buildings widening often becomes prohibitively expensive. CLEVELAND CITY PLAN COMMISSION

WHAT IS TRUE IN CLEVELAND IS TRUE ELSEWHERE

Comparative Traffic Efficiency of 66 foot and 86 foot street



The 86 foot thorofare takes but 30% more land than the 66 foot thorofare yet it is 4 times as efficient.

It will pass twice the traffic at 2 or 3 times the average speed.

CLEVELAND CITY PLAN COMMISSION

A LESSON GRAPHICALLY TAUGHT BY THE CLEVELAND COMMISSION

the Y. M. C. A. and University classes, and many special groups.

Thus far the Commission has published pamphlets explanatory of the temporary "Building Line Ordinance" and "The Cleveland Thoroughfare Plan," and has on the press a limited edition of one entitled "The Cleveland Zone Plan." It is hoped that funds, in addition to those at the disposal of the Commission, may be subscribed to provide for the printing of at least 20,000 of the latter. Another pamphlet on parks and playgrounds is proposed. A leaflet on "The Brooklyn Neighborhood Plan" has been published, a notice of which with its accompanying illustration appeared in the May number of *THE AMERICAN CITY*. Numerous papers by Mr. Whitten, Special Adviser to the Commission, have been published from time to time, and in some cases reprinted. Several periodicals have been very generous with space for articles and news items. Local and metropolitan newspapers, large and small, and recently the foreign language journals, have printed many interviews, articles and even series

of articles and editorials on city planning.

An historical celebration was planned for the 125th anniversary of the founding of the city. July 25, 1921, was "Civic Day" and was marked by events centering attention on city planning, development of the Metropolitan Park Plan, University Group Plan, Mall Plan, Public Hall, etc.

A collection of thirteen posters has been prepared, of which the illustrations for this article are representative. They are designed for general use. A check list with costs of different sizes and kinds of prints may be secured upon application to the Secretary of the Commission.

The use of at least one prominent street corner for display purposes has been tentatively promised. A competition of ideas entitled "The Eric Cemetery Contest," described in the June issue of this magazine, aroused considerable attention. The Advertising Club of Cleveland is preparing a publication to include a chapter on city planning, and the organized support of every civic body is being sought.

HARRY B. BRAINERD,
Architect, City Plan Commission.

Concrete Highway Bridge and Culvert Standards—Part I

State Culvert and Highway Standards Tabulated and Discussed

By A. C. Irwin

CONCRETE is now serving as the material of which many highway bridges are constructed for all sorts of openings, ranging from a small-diameter single concrete pipe culvert to the enormous arch span of 400 feet now under construction over the Mississippi River at Minneapolis, Minn. The types of concrete bridge structures now in use are almost as numerous as those developed for steel construction. The spans for which these various types are suitable overlap each other so that a well-recognized type is available for any span, from the shortest to the longest.

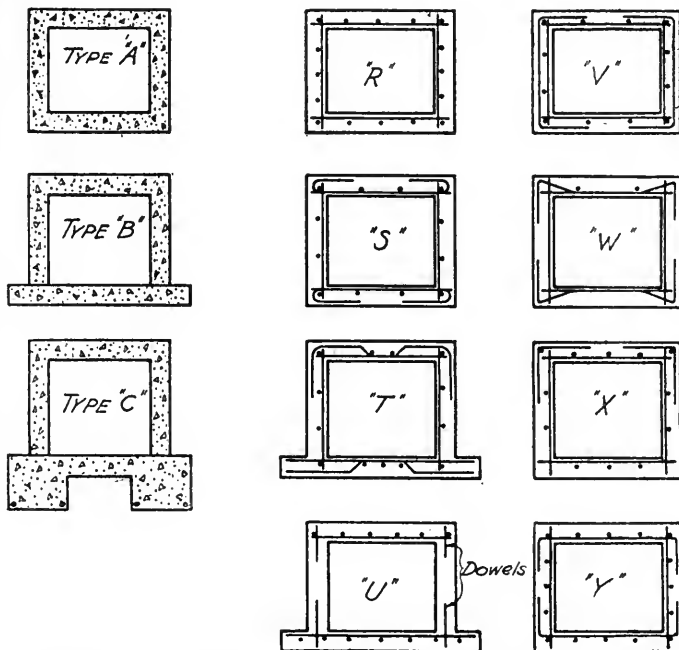
Many of the types developed follow rather closely the form of accepted designs for steel structures, and, as with them, the length of span at which absolute economy would dictate that one type give place to another is not clearly defined. Thus, before the maximum diameter of concrete culvert pipe is reached, the box culvert, either single or multiple, is used. The reinforced-concrete slab and the plain concrete arch culvert come next in the increasing scale of spans, followed by the girder type, which has been used for spans of over 140 feet. The ordinary spans for which girders are used are as great as the spans of thousands of reinforced-concrete arches, but the arch type is the present accepted one for long spans.

The rainbow arch and the concrete truss have also received considerable attention in the last few years and give promise of extending the economical length of span beyond that

already obtained by the strictly concrete girder type.

Concrete Pipe Culverts

Concrete culverts may be divided into two classes, depending upon the method of construction, namely, cast in place culverts, and precast pipe culverts. The states of Delaware, Oklahoma and Missouri have standards and specifications for precast culvert pipe, and standard designs were received for pipe culverts from Delaware, Illinois, Oklahoma and Missouri. Diameters of pipe culverts range from 12 to 36 inches in these standard designs, and the thickness of the shell from 3 to 11 inches for those cast in place and from 2 to 4 inches for precast pipes. Illinois uses concrete pipe culverts in which a light pipe is used for an inside form and is encased in 4 inches of concrete.



COMPARISON OF ARRANGEMENTS OF REINFORCEMENT FOR CONCRETE BOX CULVERTS

At left—Three standard box culvert sections

DATA ON BOX CULVERTS

State	Size of Opening		Length	Head-wall Type	Reinforcing Scheme	Footing Plan
	Min	Max.				
Alabama.....	3' x 2'	8' x 8'	Variable	45°	R	A
California.....	3' x 2'	8' x 8'	Variable	30° & St.	U	B
Colorado.....	1' 3" x 10"	10' x 10'	Variable	45°	W	A
Connecticut.....	2' x 3'	5' x 3'	28'	St.	S	A
Georgia.....	2' x 2'	8' x 8'	Variable	45°	R	A
Idaho.....	3' x 3'	5' x 5'	Variable	30° & 45°	W	A & C
Illinois.....	2' x 2'	5' x 5'	Variable	St. & U.	Y	A
Indiana.....	2' x 2'	5' x 5'	Variable	St., U. & 45°	V	A
Maryland.....	1' 6" x 1' 6"	5' x 5'	Variable	St.	R	A
Mississippi.....	4' x 4'	10' x 6'	Variable	45°	R	A
Nevada.....	2' x 2'	10' x 10'	Variable	30° & St.	R	A
New Hampshire.....	2' x 2'	5' x 5'	21' to 39' 6"	St.	R	A
Missouri.....	2' x 1' 6"	12' x 6'	24'	St. & 45°	S	A
New Mexico.....	4' x 4'	....	Variable	St.	Mod. R	A
North Carolina.....	6' x 4'	....	Variable	30°	R	A
Oklahoma.....	2' x 2'	8' x 8'	24' to 40'	St., 45° U.	U & V	B & A
Oregon.....	2' x 2'	8' x 8'	24'	45°	T	C
South Carolina.....	....	8' x 9'	28'	45°	R	B
Tennessee.....	2' x 1' 6"	10' x 8'	....	45°	R	B
Texas.....	2' x 2'	10' x 5'	24' to 30'	30°	R	A
Virginia.....	3' x 3'	6' x 6'	Variable	45°	X	B
West Virginia.....	....	....	Variable	30°, St., 45°	....	A
Wyoming.....	3' x 3'	6' x 6'	24'-48'	45°	X	B

Delaware uses the wing type of head-wall with footings, as distinguished from the straight type used by the Illinois Highway Commission. Standard practice is to lay the culvert with a slope equal to that of the stream flow, and apparently there is nothing to be gained by increasing this.

The plans received for concrete pipe culverts are not sufficient in number to arrive at any conclusion about standard practice in the use of extension or cut-off walls at the up- or down-stream ends of the culvert, or in regard to the use of aprons at the down-stream end. However, standard plans for concrete box culverts indicate that a vast majority of state engineers consider cut-off walls necessary, at least on the up-stream side of the culvert.

Box Culverts

The table above gives some of the points of difference exhibited by the standard designs for box culverts of various state highway commissions. It will be noted that concrete box culverts of the minimum size of 2 by 2 feet are standard for seven states of those reporting, and that 12 feet is the maximum span. The illustration gives a comparison of types of sections and arrangements and location of reinforcing and construction joints.

The common practice is to set a minimum depth for cut-off walls which can be increased at the discretion of the highway engineer. This minimum depth seems to be about 2 feet. These walls prevent scour at the down-stream end of the culvert barrel,

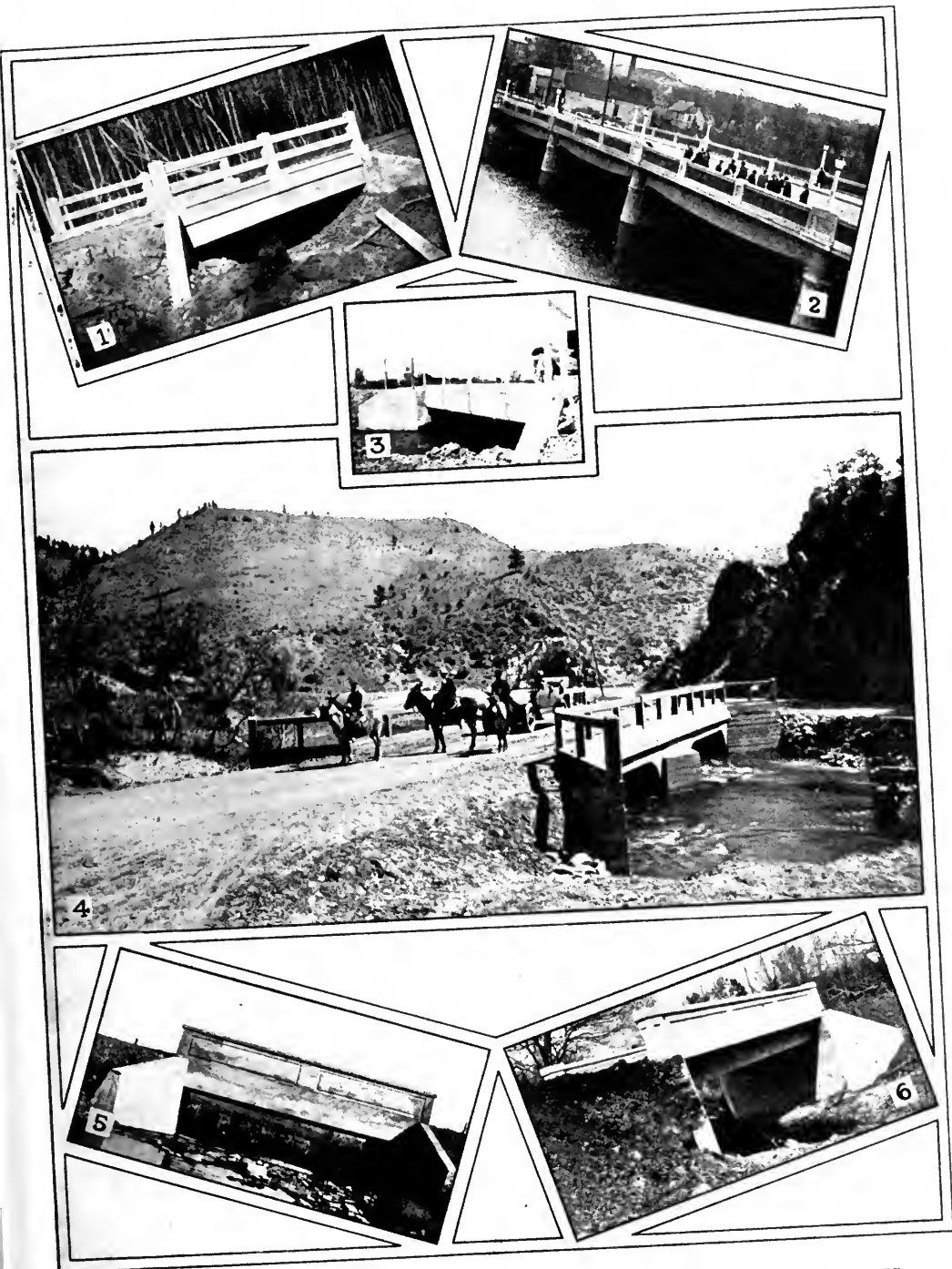
assist in anchoring the culvert in place and also in reaching firmer foundations at points where the upper layers of earth are soft and non-resistive.

Separate foundation footings are seldom shown, the floor of the barrel being depended on to spread the load to the soil. Construction joints are not generally shown in concrete box culverts. Where such joints are shown, they usually occur at the point of junction of the side walls with the floor of the culvert and are made with a groove in the slab in order to anchor the side walls against the thrust of the filling material.

It does not appear that the local conditions under which box culverts will be used are sufficiently different to call for any great difference in the thickness and reinforcing of the top and side walls.

Expansion joints are usually ignored, regardless of the length of the culvert, the designer apparently assuming that the difference in temperatures occurring under a fill will not produce sufficient expansion or contraction to cause serious damage to the culvert.

Undoubtedly, the depth of fill, both minimum and maximum, was given consideration by the designers when fixing the thickness of concrete and in specifying the amount of reinforcing to be used. None of the spans examined, however, show either a minimum covering for concrete box culverts, or the live load which the culverts were designed to carry. This applies also to the pipe culverts.



TYPICAL CONCRETE GIRDER AND FLAT SLAB CULVERTS ON AMERICAN HIGHWAYS

1. Girder type culvert with concrete rails, Thomas County, Georgia.
2. Reinforced concrete deck girder bridge over Fox River, Dundee, Ill., built in 1917, with four 55-foot 8-inch spans, a 42-foot roadway and two 8-foot walks.
3. Typical culvert in Wyoming.
4. Bridge over Bear Creek near Morrison, Colo.
5. A standard culvert at Bear Branch, Md.
6. A 35-foot deck bridge in North Carolina

DATA ON SLAB SPANS

State	Span Length		Loading	Roadway	Head-wall
	Min.	Max.			
Alabama.....	6'	20'	15-ton truck and 30% impact	16' to 20'	....
Arkansas.....	3'	20'	15-ton truck and 30% impact	22'	30°
Colorado.....	8'	20'	20-ton roller or 100 lb. per sq ft.	20'	45°
Connecticut.....	6'	20'	.....	23'	30°
Delaware.....	6'	18'	20-ton truck or 200 lb. per sq. ft.	32'	45°
Florida.....	8'	12'	{15-ton truck with 30% impact, or 150 lb. per sq. ft.	18'	45°
Georgia.....	6'	20'	{15-ton truck with 30% impact, or 120 lb. per sq. ft.	18' or 20'	40°
Idaho.....	21'6"	21'6"	20-ton engine, 25% impact	18'	45°
Illinois.....	10'	20'	.....	16' to 30'	....
Indiana.....	5'	20'	20-ton engine	28'	U and 45°
Maryland.....	6'	16'	.....	.....	U and 45°
Mississippi.....	6'	20'	15-ton truck and 30% impact	16'	45°
New Mexico.....	12'	12'	.....	16'	45°
North Carolina.....	14'	14'	15-ton truck and 30% impact	18'	45°
Ohio.....	9'	20'	.....	20' to 24'	45° and St
Oklahoma.....	2'	20'	{15-ton truck with 30% impact, 120 per sq. ft.	20'	U-St-45°
Pennsylvania.....	2'	20'	.....	23'	30°
South Carolina.....	.....	.....	15-ton truck and 25% impact	.....	30°
Tennessee.....	4'	24'	15-ton truck and 30% impact	16'	45°
Texas.....	8'	20'	.....	16' to 24'	....
Vermont.....	5'	20'	.....	.....	....
Virginia.....	8'	20'	.....	20'	45°
West Virginia.....	10'	30'	.....	16' to 20'	45°
Wyoming.....	7'	15'	.....	.....	45°

Slab Bridges

It will be noted in the table "Data on Slab Spans" that the shortest span for which we find standard plans for slab bridges is 2 feet, and that the greatest span is 30 feet. Some highway engineers consider that spans over 20 feet should have plans prepared especially for them.

Difference in practice is shown in the matter of sliding joints for slab bridges. By far the greater number do not provide such joints for spans up to 20 feet. While it does not seem worth while to go to any considerable extra expense to provide slid-

ing joints for ordinary slab spans, a computation of the unit stresses likely to occur under great ranges of temperature indicates that a construction joint at the seating of the slab on the pier or abutment should be made.

In Wisconsin State Highway Commission standard designs the railing is cast monolithic with the slab and is given a simple paneling. The abutments are of the reinforced concrete type. This is the prevalent type of abutment for slab bridges.

ACKNOWLEDGMENT.—Printed by permission from the forthcoming copyrighted proceedings of the American Concrete Institute, Vol. 17.

(To be concluded in the September issue)

Walk on the Left Side

An Important Principle in Reducing Street Accidents to Pedestrians

Pedestrians who use the state highways in rural sections are urged to walk on the left side of the highway.

By walking on the left side, the pedestrian will always see approaching cars, for he will be facing them. When walking on the right side he must trust the sight and skill of the drivers of cars and other vehicles.

One of the most important reasons for

such a movement is the safety of night travelers. A man on foot can see an approaching car long before it reaches him because of the lights, but the driver of a motor vehicle cannot see a pedestrian at night until he is almost upon him.

This idea has been tried out in various ways, and it is a big improvement over the present practice of walking on either side of the highway.

An Annual Prize for Service to Philadelphia

A TRUST fund established by Edward Bok provides an annual prize of \$10,000 for the person rendering during the year the greatest service to the city of Philadelphia. The prize is known as the Philadelphia Award, and the provisions give great latitude to the Trustees in defining "greatest service." The act or work for which the award is given must be of far-reaching importance and of general service to the inhabitants of the city.

Dr. W. W. Keen, chairman of the Board of Trustees, is quoted as follows: "It may be anything that advances the interests of the public. It may be a book that teaches practical humanitarianism, it may be an act that saves the lives of many people, or

it may be a famous painting that brings credit to the city of Philadelphia. But it must be, in the minds of the members of the Board, of distinct service to Philadelphia.

"The persons receiving the award do not have to live in Philadelphia . . . just so long as they are identified with some business or some institution in Philadelphia. But they must live in the Philadelphia district."

In case there is no service of such merit as to deserve the granting of the award, the money will be applied on free scholarships in ten universities and colleges in the Philadelphia district. The exact method of selecting beneficiaries of the scholarships has not yet been determined.

The first award will be made in the spring or summer of 1922.

It would interest you to know that—

An interesting piece of personal advertising undertaken some time ago by the Public Library of Salt Lake City has resulted in the increased and increasing use of the Library by business men. Using the classified index to the city directory as a guide, a personal letter was sent to each business man represented there, inviting him to make use of the Library and mentioning two or three of the latest books along his special line to be obtained there. The immediate response in the way of replies was most interesting, and the results have been evident in the constantly growing circulation of books on all practical lines.

Two of the five city commissioners of Memphis, Tenn., are engineers, and six other engineers hold important city offices. Considering that a great part of a city's expenditures are for engineering projects, it is good business for a city to give appropriate recognition to this profession in selecting its officers.

will be displayed for dealers and buyers, who have been invited from every state in the Union and from Mexico and South and Central America. Over 300,000 visitors will be received in the display room, it is estimated.

An interesting inquiry has reached us from a small city on a main traveled highway. This city is debating the wisdom of routing through traffic, particularly heavy truck traffic, around the city on a specially constructed highway instead of permitting all such traffic to pass through the congested business district. THE AMERICAN CITY will welcome expressions of opinion from municipal officials and highway engineers and chamber of commerce secretaries on this point. Many cities on main traveled highway routes will, with the increase of vehicular traffic, face this question in the near future.

During the past year 3,501,000 men, women and children enjoyed the facilities for organized play provided by the city of Detroit. The per capita tax for recreation was one-fiftieth of a cent a day. The program for the coming season is expected to reach a still greater number of people.

The first annual Market Week and Trade Exposition of Los Angeles-made products will be held August 8 to 13. Over 1,000 articles manufactured in 3,500 factories

Transportation, Cleanliness and Protection by Motor Trucks

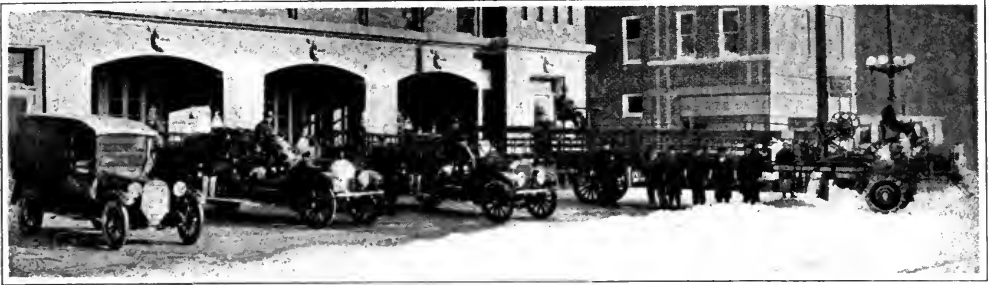


WATERLOO TRACTOR HAULING GRAVEL-SPREADING MACHINE ON THE WILMINGTON PIKE, WEST CHESTER, PA.

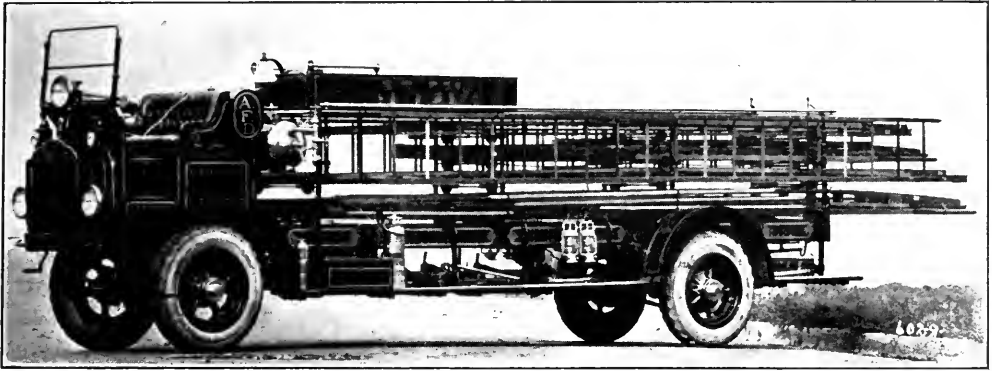
The road surface is prepared for resurfacing by sweeping, the tar is then applied and then the gravel spread by the machine. Two men stand at the ends and shovel the gravel into the hopper; it then drops onto the revolving cone and is scattered across the road



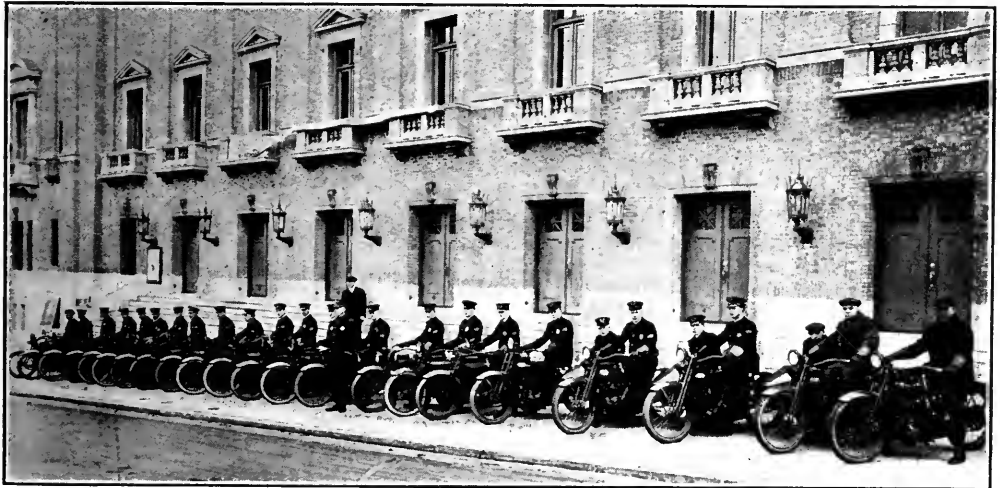
ONE OF A FLEET OF 6-CUBIC-YARD MACK TRUCKS USED BY THE DEPARTMENT OF PUBLIC WORKS, PHILADELPHIA, PA.



TWO AMERICAN-LA FRANCE COMBINATION CHEMICAL AND HOSE CARS AND A 6-CYLINDER 85-FOOT AERIAL TRUCK IN FRONT OF THE CENTRAL FIRE STATION, ENDICOTT, N. Y.



A 216-INCH-WHEEL-BASE FWD HOOK AND LADDER TRUCK, WITH 40-GALLON CHEMICAL TANK, RECENTLY PUT INTO SERVICE BY THE CITY OF ASHLAND, WIS.



A PORTION OF THE MOTOR-CYCLE POLICE OF PORTLAND, ORE.

In the Traffic Department of the Portland, Ore., Police Department are 27 Harley-Davidson motor-cycles, some of which are fitted with side-cars. The average total monthly expense per machine is \$6.19. The average amount of money spent on each machine each month, not including the damage resulting from machine accidents, etc., is \$5.31. The mileage per machine is in the neighborhood of 3,000 a month, throughout the entire year. The principal items and total expenditures contributing to the above calculations are: new parts purchased, \$1,720.39; accessories and equipment, \$292.39; tires, \$370.37; shop purchases, \$513.71

Chamber of Commerce Activities in Public Affairs

Secretary Hoover on Program of American City Bureau Summer School

IT is expected that Herbert Hoover, Secretary of Commerce, will address the Summer School of Community Leadership, which is to be held at Madison, Wis., August 15-26. He has notified the American City Bureau that he will do so unless prevented by urgent government business. Other speakers of national prominence will appear on the program of the School.

An elaborate series of manuals covering every phase of municipal activity has been prepared for the students, covering in detail such subjects as "Statistics and Graphic Presentation," "Community Advertising," "The Delinquent Member," "An Accounting System for Chambers of Commerce," "Program of Work," "Procedure in City Planning," "Budgets and Expenditures," and others. These will be distributed to enrolled students and used in conjunction with the course.

A convincing proof of the value and popularity of the school is found in the fact that the enrollment includes more than seventy men who have attended past sessions.

The social and recreational needs of the students are fully taken care of by dances, games, and water sports.

Industrial Survey Prepares for Business Expansion

SAN JOSÉ, CALIF.—Realizing the need of a careful study of business and industrial conditions so that the future development and growth of the city and its industries may be scientifically stimulated and directed, the Chamber of Commerce of San José is now conducting a thorough survey of local industries. This industrial survey, which has been under way since April 1, was recommended by the Industrial Investigations Committee of the Chamber, headed

by W. T. Rambo, and the actual field work is being handled by two Stanford men, W. L. Connolly and H. F. Ormsby, under the supervision of Professor Cottrell of Stanford University. Up to date, approximately one hundred of the larger business and industrial firms have been interviewed, including many of the large canning and packing establishments which comprise the chief line of industry in the Santa Clara Valley. The latter are being carefully studied with a detailed questionnaire to bring out the facts desired.

A careful plan of approach to the field work of gathering the facts and figures needed was worked out by the men making the survey and the committee in charge, and so far it has given very satisfactory results. The first step was to take the large questionnaire submitted by the committee, which was comprised of nearly fifty questions, not including subdivisions, and to cut this down to a short general questionnaire of about twenty questions which applied to every industry. For the use of the investigator a code card was printed which had on it simply the numbers of the questions and appropriate spaces for putting down the answers. A supplementary questionnaire was prepared for the specific classes of industries, such as manufacturers and wholesale dealers, and on this were included the specific and detailed questions applying to each particular business. This method has saved a great deal of time and annoyance and has added materially to the thoroughness of the survey.

The next step was to spot the industries on a large "use map" of the city, putting in a pin clip and card showing by color the classification, and giving the name and address of the firm. Then a directory was compiled including these, and such relevant material as could be ascertained as to the size and importance of the industry, the name of the representative from whom the

information could be secured, as well as information on his or his firm's general attitude toward such modern methods as "industrial surveys."

Then began the actual field work, which was mailing out form letters explaining the nature and purpose of the survey, signed by the men in charge, and enclosing copies of the general questionnaire and the supplementary sheet applying to the particular industry of the man addressed. In the letter it was explained that he would be phoned later, when a personal appointment would be requested, and he was asked to coöperate by having as many of the facts marshaled as would be practical. This was followed by personal appointments arranged by telephone, as indicated, and the fact that practically perfect results have been secured up to date shows that systematic and businesslike preliminary preparation for the field work in a survey gives it weight and prestige which insure coöperation and more accurate returns.

The survey was completed by the latter part of May, when the men in charge presented a report giving the relevant facts as to the industrial and commercial situation in San José, including Santa Clara County, such as compilation and interpretation of the facts and figures on the questionnaire showed, supplemented by related factors gathered from various other sources, covering the fundamental resources and location of raw materials, transportation, comparative municipal reports, city government, city planning, housing, recreation, health reports, etc. This is to be presented with maps, graphs and charts, in a form that will be useful both for community education in driving home significant facts about local problems and conditions, and for showing and advertising what San José actually has in the way of resources and opportunities for new industries.

ROSCOE D. WYATT,
Manager, Chamber of Commerce.

Paved Highway Brings Trade to Springfield's Wholesalers

SPRINGFIELD, ILL.—The opening of a new stretch of concrete highway extending from Peoria to Springfield and beyond, presented to the Springfield Chamber of Commerce an opportunity to cultivate the retail trade of two cities located on the highway, in which

Springfield wholesalers had hitherto been unable to make much progress because of the poor rail connections with those places. As soon as the new highway was completed, the Springfield Chamber conducted a goodwill trip to those towns. The party was composed of thirty of Springfield's wholesale merchants, each of whom entertained a local retail merchant as his guest at a luncheon which had been arranged for in advance by the Chamber of Commerce. That trip was followed by another one upon the occasion of the dedication of the highway.

This effort was augmented by the establishment of an auto trucking service between Springfield and the two towns mentioned, the trucks making regular trips three times a week, and an extra trip at any time that the merchant guaranteed a sufficiently large load to make the trip pay. The rates for this service are based on the prevailing freight rates, to which 10 per cent is added, and delivery is guaranteed. With this fast service, comparable only to the express service of the railroads, for which higher rates must be paid, the salesmen of Springfield's wholesale concerns are obtaining a lion's share of the orders from the towns on this route.

H. B. JOHNSTON,
Publicity Secretary, Springfield Chamber of Commerce.

Chamber Offers Prize to Boys' Organization

PEABODY, KANS.—In many cities the areas in the immediate vicinity of the railroad stations are by no means attractive in appearance. To remedy this situation in Kansas, the Peabody Chamber of Commerce has adopted the "Peabody Plan." Its first purpose is to attempt a state-wide movement to clean up along the railroads and to include also the main automobile roads. With that in mind, on or about November, 1922, the Chamber of Commerce will award a prize of \$1,000 in cash to any organization of boys in any second- or third-class city, town, or village in the state of Kansas who have made

1. The highest score in an effort to clean up and beautify the strip of property in their home city or town bordering on the railroad right of way and the main automobile trails leading into and out of the city;

2. The best record, in final score, of clean living, clean sports, and a reasonable amount of religious activities.

The standard of judging is as follows:

1. Clean, healthy play and amusements..... 15%
2. Work: hours of paid employment and free service 15%
3. Fellowship: highest per cent of boys secured for the contest groups and other boy improvement schemes, conditions of social life commendable, etc. 10%
4. Religion: the attendance and membership in Sunday School, young people's societies, and church 20%
5. Civics: clean-up and improvements..... 40%

The condition as to civics requires that they must undertake the clean up as indicated above, besides having rubbish carted away and ground leveled, and keeping the streets free from glass and nails. The boys may encourage property owners to make landscape garden plats, whitewash fences and trees, to repair and paint old dwellings, and to remove the unsightly ones no longer in use. It is especially desirable to attract the attention of tourists on railway or auto

from Peabody, chosen by the Chamber of Commerce, and a third chosen by the other two. They will visit the competing towns to investigate their claims, requiring from each an itemized statement of what has been done, and how it has been done. This itemized statement will be signed and attested by a number of persons of high local responsibility.

This plan has been well received among Kansas communities, and it is anticipated that it will evoke general interest and enthusiasm.

L. R. STOTTS,
Secretary, Peabody Chamber of Commerce.

Planting a Municipal Forest Along the City's Water-Supply

NEWBURGH, N. Y.—For five years the Tree Planting Committee of the Newburgh Chamber of Commerce has conducted an annual tree planting day. On the first of these occasions the matter of tree planting



THE BERKS COUNTY, PA., CONSERVATION ASSOCIATION PLANTED SEVERAL THOUSAND PINE SEEDLINGS IN A SINGLE DAY

lines, hence every contesting group is urged to feature a large attractive bill-board on which their achievements and claims may be announced to the public. It is not necessary for the boys to do all the work, but they may inspire property owners and the city authorities to do their part.

As to the final judging of the contest, the three judges will include one chosen by William A. McKeever of Lawrence, one

was taken up with the Board of Education and the City Manager, with the suggestion that the Senior and Junior High School Classes do the planting. The State School of Forestry cooperated, sending a professor to speak on the appointed day.

We planted 4,500 trees the first year, all red pine and Norway spruce. Each year since then we have planted 3,000 trees, of the type recommended by the State School

of Forestry after an investigation of the soil and conditions of this locality.

The planting is done on ground owned by the city, and surrounding the water-supply. The old scrub growth is cleared away the fall before, and the ground is properly prepared. A day in the latter part of April is set apart, and the school children are taken out to the fields in automobiles lent for the occasion by citizens. After arriving at the point designated for the planting, suitable exercises are held and the planting is done under the direction of the forester. By noon-time we have accomplished the planting of about 2,000 trees; then luncheon provided by the city is served. After this, there is a little loafing spell and then the rest of the trees are set out and the roll is called.

This tree planting accomplishes many things. It gives the children a day in the open; it teaches them something of trees and plant life, giving them a permanent interest in the trees which they have helped to plant; it instills the idea of conservation into their minds; and it makes for a purer and better water-supply for the city's use.

The whole proposition is so inexpensive and the benefits derived so many and so great, that we expect to continue the work until all the waste and unused land around the water-works system shall have been planted.

At the first year's planting, motion pictures were taken by the State Department of Education, and these have been used for exhibition purposes in various high schools.

CHARLES E. TOWNSEND, M. D.,

Chairman, Tree Planting Committee, Newburgh Chamber of Commerce.

More Business in City Government

SUPERIOR, WIS.—Through the Civic and Commerce Association, Superior has organized a Board of Estimate and Control for the purpose of introducing into its municipal government a greater exercise of business judgment. The results already obtained are evidence that it will be a permanent organization and one destined to play a most important part in city affairs and government.

The Board is composed of one member from each of the following organizations: The Civic and Commerce Association, Rotary Club, Kiwanis Club, Real Estate

Board, Women's Council, Building Trades Council, Board of Supervisors, City Commission, School Board, the Billings Park Civic Association, the South Superior Commercial Club, the East End Chamber of Commerce, the North End Progressive Association and the Allouez Chamber of Commerce. This arrangement takes in all organizations directly interested in community affairs and represents the thought of the majority of citizens. Each representative reports to his particular organization the activities of the Board.

The original Board of fourteen is rather large to deal efficiently with all matters, and is therefore divided into three committees, as follows:

One on City Affairs, with the member of the City Commission; one on School Affairs, with the member of the School Board; and one on County Affairs, with the member of the County Board of Supervisors. By placing in each subdivision a member of the department directly in touch with affairs of his particular branch, other members of the committee can be advisedly informed at all times and have assurance of competent counsel before taking definite action.

The Committee on City Affairs will take up various phases of city government by departments, looking into expenditures that have been made and proposed appropriations for each department. It will eliminate all wasteful expenditures and examine carefully all requisitions for new equipment, and determine whether or not they are absolutely necessary. It will meet with the City Commission from time to time and criticize or advise as it seems necessary.

The School Affairs Committee will eliminate—and, in fact, has already eliminated—wasteful spending of public moneys, without impairing efficiency. The system of training used in local schools has aroused considerable outside interest owing to its high standards, and it is the intention of the Association to maintain this system unimpaired.

The County Affairs Division will endeavor to curtail expenditures of moneys throughout the county where considered in any way non-essential. Proposed issuance of road bonds will be given close attention, also bond issues for other improvements.

The Association has remarked that in all cities there is a tendency for tax rates to

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increase each year. To prevent this, needful expenditures for desirable improvements are often curtailed. Wasteful extravagance, when brought to light, generally leads to investigation, and often results in the inauguration of a policy of excessive economy, which produces a state of affairs even worse. It is believed that this Board of Control will enable Superior to steer a middle course between extravagance and parsimony.

Coöperation with the Board will promote a great interest on the part of the average citizen in all affairs in and about the city. The influence of the Board of Control is already being felt, and there is every reason to believe that it is becoming a strong factor in the city government.

W. H. TYSON,

Acting Secretary, Superior Civic and Commerce Association.

Better Roads and Better Times

ROME, GA.—On June 16, Floyd County, Georgia, adopted a \$750,000 road bond issue with a vote of 3,112 to 67.

The Floyd County Commissioners, when they had decided upon the bond issue, asked the Rome Chamber of Commerce to put the matter through. This project was entered into May 21, and after three weeks of an intensive publicity and educational campaign the voters recorded a decisive vote in favor of "Better Roads and Better Times"—the slogan of the campaign.

When the campaign started it was found that the county registration list contained

the names of approximately 6,200 persons, some of whom were dead and others moved from the county. The problem was immediately attacked, and 1,400 names were stricken from the list. City and county organizations were perfected and a determined campaign for the road bonds was waged until the close of the polls. Headquarters were established in the offices of the Chamber in the Hotel Forrest Building, and the Secretary of the Chamber was put in executive charge.

John M. Graham, president of the National City Bank, was named chairman of a committee of nineteen chosen from the Chamber membership, Rotary and Kiwanis Clubs, Farm Bureau and other organizations, by President John M. Vandiver of the Chamber.

The \$750,000 issue will be spent one-half for first class roads and one-half for second and third class roads. The first class roads will also receive approximately the same sum from Federal Aid. Paved roads already started will be completed to the county line in several directions, and the main line of the Dixie Highway will be paved throughout the county. The bond issue was validated July 2, and the bonds were offered for sale immediately thereafter. The Board of Roads and Revenues has made available a considerable sum in order that surveys and preliminary work may be started.

LESTER C. BUSH,

Secretary, Rome Chamber of Commerce.

On the Calendar of Conventions

AUGUST 1-8—PALO ALTO, CALIF.

Western Summer School of Community Leadership. Address Charles A. Simmons, Western Manager, American City Bureau, Merchants' Exchange Building San Francisco, Calif.

AUGUST 10-12—CHICAGO, ILL.

International Association of Street Cleaning Officials. Annual conference. Secretary, A. M. Anderson, 1340 Old Colony Building, Chicago, Ill.

AUGUST 15-26—MADISON, WIS.

Summer School of Community Leadership. Address Ralph G. Stoddard, Business Manager, American City Bureau, Tribune Building, New York, N. Y.

AUGUST 16-18.—SIOUX CITY, IOWA

League of Iowa Municipalities. Annual meeting. Secretary, Frank G. Pierce, Marshalltown, Iowa.

AUGUST 21-23.—CHAUTAQUA, N. Y.

Open Forum National Council. Annual meeting. Secretary, Robert S. Holmes, Daytona Beach, Fla.

AUGUST 23-25.—DETROIT, MICH.

American Association of Park Superintendents. Annual meeting. Secretary, Emmett P. Griffin, Superintendent of Parks, East St. Louis, Ill.

AUGUST 23-25.—BUTLER, PA.

League of Cities of the Third Class in Pennsylvania. Annual convention. Secretary, Fred H. Gates, City Clerk, Wilkes-Barre, Pa.

SEPTEMBER 6-12—COLORADO SPRINGS, COLO.

International Association of Municipal Electricians.

Annual convention. Secretary, Clarence R. George, Houston, Tex.

SEPTEMBER 7-9.—NORFOLK, VA.

League of Virginia Municipalities. Annual convention. Secretary, L. C. Brinson, Portsmouth, Va.

SEPTEMBER 13-15.—DETROIT, MICH.

Association of American Cemetery Superintendents. Annual meeting. Secretary, Aden E. Smith, care of Board of Health, Cincinnati, Ohio.

SEPTEMBER 13-16.—BRIDGEPORT, CONN.

New England Water Works Association. Annual convention. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston, Mass.

OCTOBER 11-14.—ATLANTA, GA.

International Association of Fire Engineers. Annual convention. Secretary, James J. Mulcahey, City Hall, Yonkers, N. Y.

OCTOBER 12-14.—LAWRENCE, KANS.

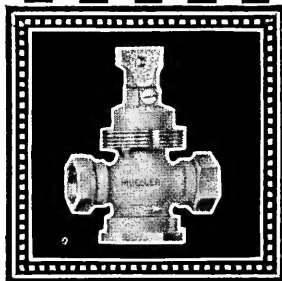
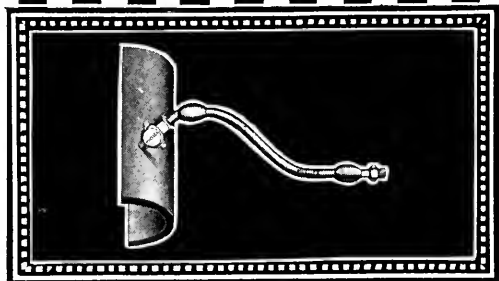
League of Kansas Municipalities. Annual convention. Secretary, John G. Stutz, University of Kansas, Lawrence, Kans.

OCTOBER 20-21.—COLUMBUS, OHIO.

Ohio State Conference on City Planning. Annual Conference. Secretary-Treasurer, Charlotte Rumbold, 201 Chamber of Commerce Building, Cleveland, Ohio.

OCTOBER 24-28.—BALTIMORE, MD.

American Society for Municipal Improvements. Annual convention. Secretary, Charles Carroll Brown, 404 Lincoln Avenue, Valparaiso, Ind.



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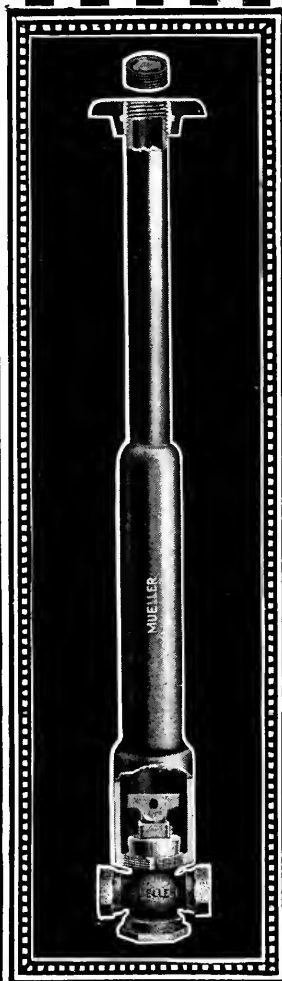
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Modern Methods of Water-Supply and Purification—Part II

By M. F. Sanborn

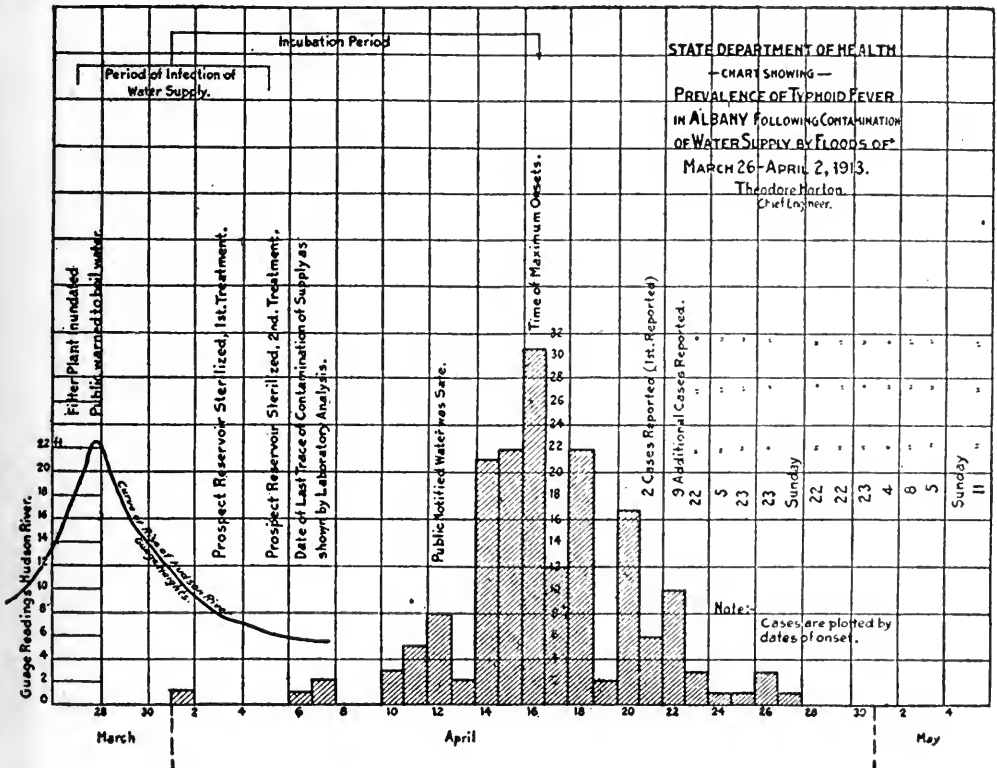
Sanitary Engineer, M. Am. Soc. C. E.

Slow Sand Filtration

SLOW sand filters are best adapted for the removal of bacteria from untreated water, and generally give a reduction of from 95 to 99 per cent of bacteria. They are not as efficient in the removal of color or turbidity as the rapid sand filters, which depend upon the precipitate caused by the addition of chemicals for the removal of the finer colloidal matter. Slow sand filters are generally covered to prevent freezing and the growth of objectionable matter, and the sides and bottom are of impervious material to prevent loss of water. They are constructed in several units so that one unit may be placed out of use for cleaning without reducing to too great an extent the available area remaining in operation. In large filter plants the units are generally about an acre in area. On the bottom of

the filter is first laid a system of under-drains to convey the filtered water to the main collecting pipes and drainage chamber. Around and above the underdrains are placed several layers of graded gravel, the finest being on top. Over this gravel is placed from 2 to 4 feet of sand having an effective size of from 0.20 mm. to 0.30 mm. and a uniformity coefficient of from 1.5 to 2.0. The finer the sand, the greater per cent of purification, but the rates are also reduced.

The effective size of a filter sand is that size of grain, expressed in millimeters, such that 10 per cent of the particles are smaller and 90 per cent larger than that size. The uniformity coefficient shows in a measure the uniformity of the sizes of the sand and is the ratio of the size of which 60 per cent of the sand is smaller, to the effective size. It





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Cincinnati	Ohio
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Los Angeles	Cal.
Milwaukee	Wis.
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New Orleans	La.
New York	N. Y.
Portland	Ore.
Richmond	Va.
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will thus be seen that the more nearly uniform the sand is, the smaller will be the uniformity coefficient.

The sand is covered with from 2 to 4 feet of unfiltered water, and the water passing through the sand meets the natural resistance of the sand and of the gelatinous coating of impurities from the water which forms on the upper $\frac{1}{2}$ -inch of the sand. This resistance causes a loss of head, which is measured by the difference between the elevation of the surface of the water on the filter and that to which the water in the underdrains would rise. The unfiltered water should at all times be distributed on the surface of the filter so as not to cause washing or displacement of surface sand.

The rates of filtration vary from 2,000,000 to 6,000,000 gallons per acre per day, depending upon character of water, size of sand, clogging in surface layer of sand, and loss of head. Constant rates of filtration are sometimes maintained by an automatic control which partially throttles discharge from drains, and as loss of head increases, on account of clogging of surface layer of sand, the outlet is gradually opened to permit the same rate of filtration.

When the loss of head reaches 4 or 5 feet, the filter is cut out of use and the surface layer of $\frac{1}{2}$ - to $\frac{3}{4}$ -inch of dirty sand is removed, cleaned, and stored to be used again. When a minimum depth of sand of from 2 to $2\frac{1}{2}$ feet is reached, the filter is scraped and the sand which has been removed and cleaned during the last 8 to 15 scrapings is replaced on top of the sand remaining in the filter.

Mechanical Filtration

Rapid sand or mechanical filters operate at a much higher rate than slow sand filters, the rates being from 100,000,000 to 125,000,000 gallons per acre per day. These filters are generally dependent upon the use of chemicals added to the water before filtration in order that a precipitate may form. This precipitate is strained out on the surface of the sand, and this strained precipitate acts in turn as a filter capable of removing from the water most of the suspended matter, including a large part of the bacteria. When this strained material on the surface of the sand becomes so thick as to greatly reduce the filtering rate, the sand is agitated by mechanical rakes, or air under a pressure of from 3 to 5 pounds per square

inch forced up from the bottom to break up and loosen the film on the sand, after which the dirt is flushed away by water which passes up through the filter and away through troughs placed above the sand.

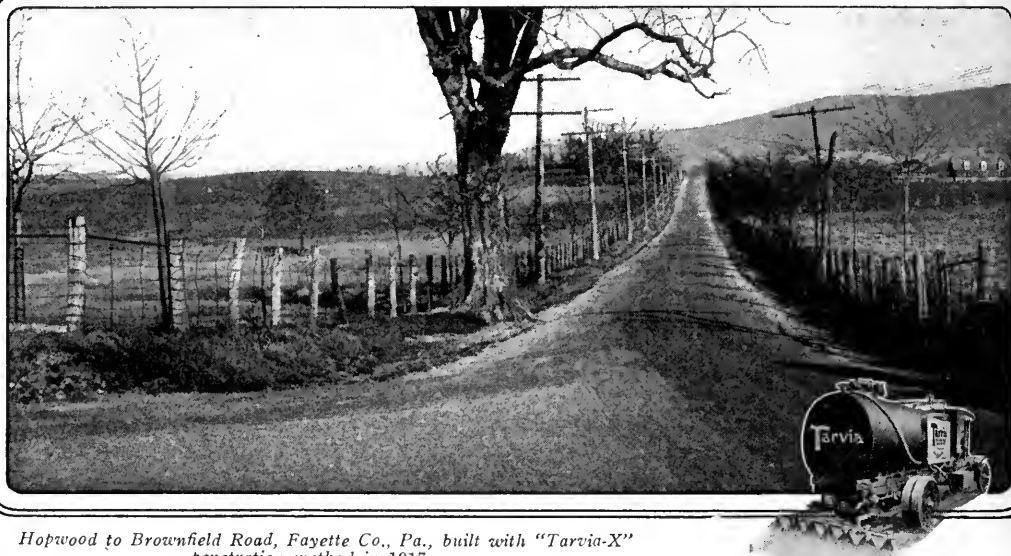
On account of the high rate of filtration and the need of thoroughly agitating and cleaning the sand, the underdrain or strainer system is very complete. The strainers are placed fairly close to each other and are usually constructed so that with a reverse flow of water for cleaning, the water is uniformly distributed throughout the filter.

Gravel graded from 2 to 3 inches at the bottom to $1/16$ -inch in size at the top is placed around and above the strainers. Above the gravel is placed about 30 inches of sand having an effective size of 0.45 to 0.50 mm. and a uniformity coefficient of 1.4 to 1.6. Fine screens of suitable material are sometimes placed between the gravel and sand to prevent the latter from passing into the gravel and partially stopping up the strainers. These are not necessary, however, in a properly constructed bed of graded gravel.

Rapid sand filters are of two types, gravity and pressure. The gravity type is the one generally used, and there is from 2 to 4 feet of water over the sand. In the pressure type the filtering sand is enclosed in an iron or steel drum or cylinder, and the water over the sand is under pressure. In this type the pressure in the outlet is less than above the sand, and this difference is the loss of head. When the loss of head in the gravity type amounts to from 8 to 12 feet, the filters are washed. Pressure filters are sometimes operated with a much greater loss of head before being washed.

Each gravity filter usually has an operating table on which are located the various gages giving height of water, loss of head, rates of flow, and also valve handles for controlling the various valves for filtering, air agitation, sand washing, etc.

The washing is done with filtered water, which after receiving the dirt from the surface of the sand passes out through the troughs. The sides of these troughs act as weirs, all at the same height and about 2 feet above the sand. The wash water should flow with sufficient velocity to carry off the dirt but not the sand, and the amount used will vary from 0.5 to 2.0 per cent of the amount filtered. When the wash water runs comparatively clear, the filter is again placed



Hopwood to Brownfield Road, Fayette Co., Pa., built with "Tarvia-X" penetration method in 1917.

A substantial Slag Road built with Tarvia—

The photograph above shows a section of the Hopwood to Brownfield Road, South Union Township, Fayette County, Pa.

This road was built over an old water-bound base by the Township Supervisors with their own forces. A five-inch course of Dunbar Bank slag was used as road metal. The slag was bound with "Tarvia-X" applied by the penetration method. A deferred "Tarvia-B" seal coat was applied two months after completion.

This is now a mighty fine piece of road that is proof against heavy traffic.

With occasional Tarvia maintenance it will last for many years, forming a mudless, dustless, automobile-proof highway of which any community might well be proud.

This is just another example of the fact that no matter what sort of a road problem town or highway officials encounter, they can turn to Tarvia with the comfortable knowledge that there is a grade and a method of application of this versatile coal-tar preparation to help them out.

Illustrated booklets, describing the various Tarvia treatments, free on request.

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Special Service Department

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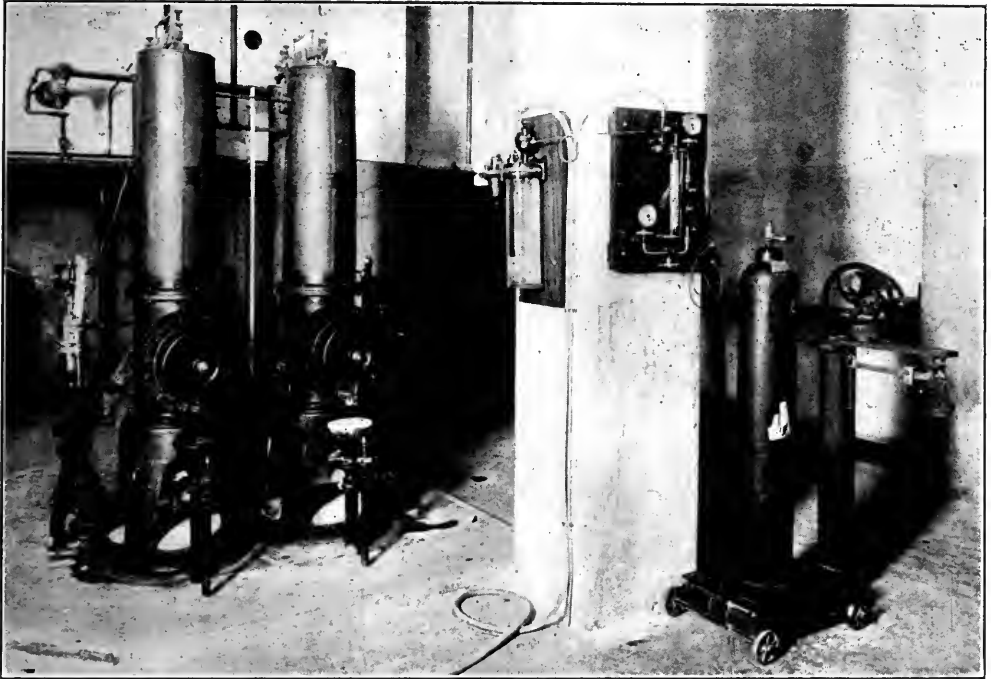
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CHLORINE CONTROL APPARATUS (AT RIGHT), GRAND RAPIDS, MICH., WATER-WORKS
 Note that scales are provided for the chlorine cylinder to check up the rate of use of liquid chlorine

in operation and the first filtered water is water reservoir below or adjacent to the use.

The filtered water passes to a filtered water reservoir below or adjacent to the filters and then flows or is pumped to the distributing mains. The filtered-water reservoir should be covered to exclude sunlight and thus prevent to a large extent the growth of algae or other microscopic organisms. The chemical commonly used for treatment preliminary to mechanical filtration is some form of alum or iron, and in case there is not enough alkalinity present in the water to act with the alum or iron, sufficient lime is added to give a satisfactory reaction. Only enough chemicals are added to form a satisfactory precipitate, which carries down with it a large part of suspended matter present in the water.

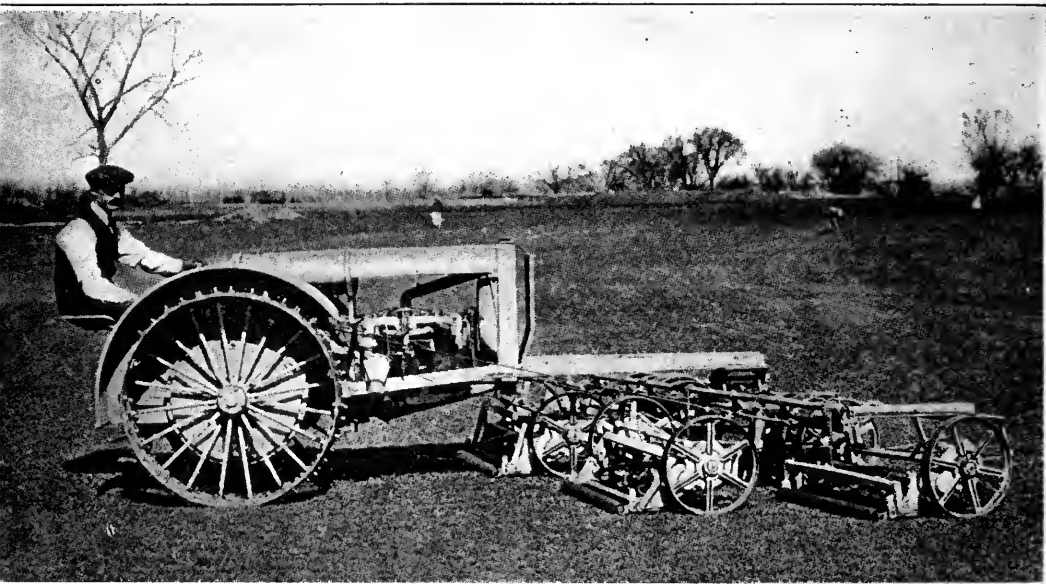
Many rapid sand filter plants have a preliminary sedimentation basin which permits of the removal of part of the suspended matter. This sedimentation is frequently assisted by the addition of the chemicals necessary for filtration, which may be added before the raw water passes to the sedimentation basin.

Drifting Sand Filters

At Toronto, Ontario, there is a new type of rapid sand filter which is called the drifting sand filter. In this filter the dirty sand is removed through special outlets, cleaned, and replaced on top of the filter through the inlet with the unfiltered water. The removal and replacing of the sand in this manner causes the surface to assume a cone formation. The filter is also back-washed in from one to seven days, depending upon the amount of clogging in the filter. The loss of head varies from a minimum of 6 feet to a maximum of 11 feet. During 1918 the filter averaged a bacterial efficiency of 85.4 per cent and a removal of 94.8 per cent of the *B. coli*. The complete treatment, including the application of liquid chlorine, gave a total removal of bacteria of 99.9 per cent.

Water Softening

Hard water is sometimes softened, first, by the addition of lime to remove the free and half-bound carbonic acid, which reduces the temporary hardness, second, by the addition of soda ash, which removes much of the permanent hardness. The chemicals are usually added previous to



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The results showed a cutting capacity of 60 to 80 acres per day—about double that claimed for any similar method.

This arrangement has also been in use on the grounds of an Atlantic City Club, and an outfit has been just shipped to the City of Richmond, Virginia.

This is the most efficient and economical method of cutting grass on large areas especially where the surface is undulating and variable.

Each unit is complete in itself and interchangeable, and made with that skill and conscientious care for which the Pennsylvania Quality line is famous.

All the exclusive features of adjustment; self-sharpening, crucible steel blades, and automobile type ball bearings are embodied in each unit.

PENNSYLVANIA LAWN MOWER WORKS, Inc.
1615 North 23rd Street, Philadelphia, Pa.

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sedimentation or rapid sand filtration in order that the precipitate which is formed may be removed. Temporary hardness is also removed by boiling. Water softening is also accomplished by special compounds such as come under the trade names of "Permutit," "Refinite."

Disinfection

The disinfection of water is generally done by the use of chlorine either in the form of hypochlorite of lime or bleach, or as liquid chlorine, and by ultra-violet light and ozone. The ultra-violet light method is as yet used only in small installations and to some extent for the disinfection of water in swimming pools. The ozone treatment is used but little in this country, although there are some fairly large installations abroad.

Chlorine in the form of bleach was first used in 1908 for the disinfection of water, and the use of bleach has gradually given way to the use of liquid chlorine, which is much easier to handle and apply, especially with the improved automatic or manually controlled feed apparatus now in use. Liquid chlorine is now used quite extensively for purifying water, either alone or in conjunction with some form of filtration.

The amounts of chlorine used are generally below 0.5 parts per 1,000,000, while for clear waters less than 0.2 parts per 1,000,000 may be used. Turbid water or waters having a high color need the most chlorine, as part of the chlorine reacts chemically with the organic matter present before producing

a marked reduction of the bacteria.

Algae Treatment

Copper sulphate is used at times for the removal of algae, diatoms and other microscopic organisms, certain types of which give very objectionable odors and tastes. The amounts used are generally from 0.1 to 0.2 parts per 1,000,000, and the copper sulphate should be thoroughly mixed with the water.

Whenever possible to do so, rules and regulations should be issued and posted to prevent pollution of public water-supplies, especially those obtained from streams, lakes, reservoirs, etc.

Conclusion

Special attention should be called to the following in order that a sufficient amount of pure water may be supplied at all times:

The need of thorough study by an expert to determine quantities and qualities available, and to plan for increased consumption for the future growth of the community.

The importance of preventing pollution.

In case of treatment such as filtration or disinfection, or both, to maintain the plant in constant operation and keep it in good repair. (Note diagram on page 143 showing temporary increase in typhoid fever in Albany during a flood in the river when the filtration plan was temporarily put out of use.)

Adequate salaries should be paid to technical and skilled operators.

What Is Health?

We sometimes assume that freedom from disease or physical defects means health, but this is only one part of the story. There are thousands and thousands of school children and adults that are not really ill and have no serious physical defects but have only energy enough to drag themselves through life—to exist physically. They do not have reserve force to meet the emergencies of life or to accomplish the things that are most worth while. They are destined to become ill from time to time, and in most cases to

be a serious burden to society. One American man of letters says that the important thing is not what you can get out of the world but what you can give to the world. Health education should seek to prevent disease and physical defects and to promote right habits of living, which play such an important part in building up robust health with its reserve force of energy. This is one of the ways of insuring to each individual his maximum contribution to the world.

DR. J. MACE ANDRESS,
U. S. Bureau of Education.



F. T. Reed, Police Chief, La Grange, Ga., who endorses the Harley-Davidson for police work.

1 Harley-Davidson 69 Arrests for Speeding \$740 Revenue to City (Three Weeks' Record)

La Grange, Georgia, ordered its first Harley-Davidson Police Motorcycle last Spring. From March 7 to April 1, Officer Roberts made 69 arrests for speeding. The gross revenue from these cases—\$740—more than paid for the machine.

Hundreds of American cities have raised their police efficiency by mounting policemen on Harley-Davidsons. For emergency calls, patrolling work, regulating traffic, running down "motorized crooks"—on any kind of roads and in any weather—you can't beat a Harley-Davidson. And the Harley-Davidson's low upkeep and remarkable durability make it a profitable investment long after the machine has earned its first cost.

Ask your local dealer for demonstration. Or write to us for special book which tells how other cities are using motorcycles for police and other official service.

Harley-Davidson World's Champion Motorcycle

HARLEY-DAVIDSON MOTOR CO.

MILWAUKEE, WISCONSIN

Service Stations as an Asset to the City

A Feature that Should be Controlled and Developed

By Lucy Lowe

THE advent of the automobile brought with it many new building types. We have grown accustomed to the sight of the garage. Whole streets are often given over to buildings for this purpose, and we find them on the lots of automobile owners and in many other places throughout the city. But the ubiquity of the garage cannot approximate that of the service or filling station.

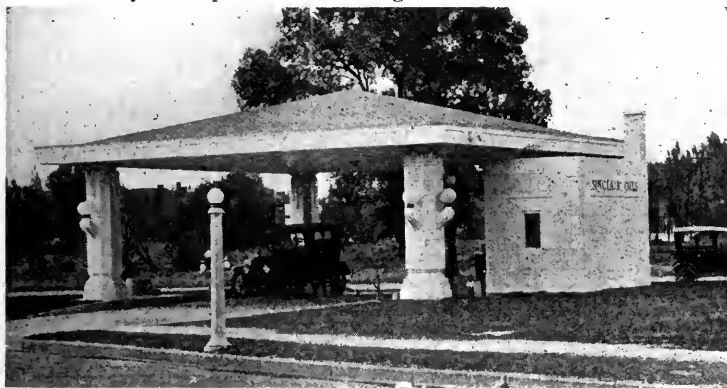
This new structure is usually a rather small building, seldom containing more than one or two rooms. It appears in brick, stone, terra cotta and wood. It may be located on a prominent corner, or almost hidden away between tall buildings; but however it may appear, it is here in large numbers and it has come to stay.

The early examples of the filling station

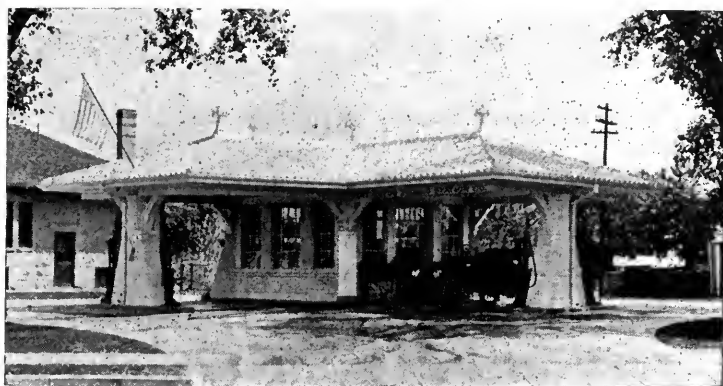
dence section of the city. Here the tumble-down shack had no place. It was not a hard transition from building artistic filling stations in the better parts of the city, to replacing those in the more commercial sections with better buildings. In the smaller cities there is more opportunity for the construction of artistic buildings than in the larger cities. There land is not always so excessively high in price, and better sites are more easily secured. Yet, strangely enough, it is usually the small town that has the less artistic structure.

The photograph on page 153 shows a pleasing type of service station, located in New Haven at the corner of Goffe and Dixwell Streets, and is an excellent example of the possibilities of improving a corner. Arrangements have been made here for one-way

traffic, thus preventing accidents, and making it much easier to handle the trade. This service station is such an excellent bit of architecture that it is almost too beautiful for its surroundings. Probably the time will not be long until the large structure in the background is removed.



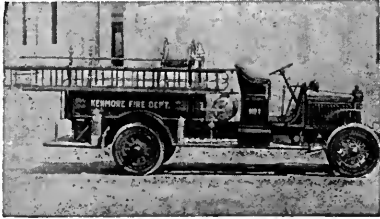
were not what one might call matters of civic pride. They were often erected in haste because of a demand for service in some quarter of the city. Gradually, however, owners began to see the value of improving the lots with better structures. Probably much of this change was due to the advent of the service station in the resi-



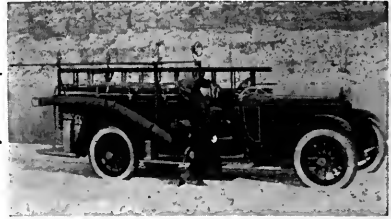
Courtesy of the National Terra Cotta Society

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A PLEASING AND PRACTICAL SERVICE STATION IN NEW HAVEN, CONN.

Here is another way in which the service station can be made a civic asset. When a particularly fine piece of building is located in a neighborhood, it tends to increase the property value and to induce property holders to refurbish up their places to be in keeping with the new addition.

Since the service station has become so indispensable a part of city development and is evidently a thing to be reckoned with, it would behoove cities to include in their ordinances regulations for the erection of such

buildings, limiting them to certain types, insisting that the design be in keeping with the other buildings of the neighborhood, as well as conforming to the usual building regulations. The immense growth that this business has made is shown by the fact that it is estimated that Kansas City, Mo., has an average of one filling station to every two or three blocks. Other cities show a like proportion, and even the town of two or three thousand usually has several such buildings.

Parks Pay

In city development there are several sound reasons to justify the acquisition of park lands at an early stage of building development, not the least of which is their direct effect upon the value of city property, and, therefore, their indirect influence upon the city's income from the taxation of land. It has been found in the case of Madison, Wis., that new parks not only met all charges, but, by reason of the increased value of adjoining property, paid into the city treasury not less than \$10,000 a year in increased taxes. A similar state of affairs exists in New York, where the amount collected in taxes in twenty-five

years on the property of the three wards contiguous to Central Park over and above the ordinary increase in the taxable value of real estate in the rest of the city was \$65,000,000, or about \$21,000,000 more than the aggregate expense attending and following the establishment of the park until 1914. In other words, in addition to acquiring lands valued at \$20,000,000, the city of New York has made \$21,000,000 in cash out of this transaction. (The original price paid for the 840 acres forming Central Park was \$6,664,500).

—*Town Planning and Conservation of Life.*

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In connection with the issuance of Bonds and other obligations, this Company's plan for the preparation and certification of Municipal issues offers valuable safeguards against over issue and forgery. Municipal officials are invited to investigate this service, which has been availed of by over 629 cities and towns in thirty-four states and the Territory of Hawaii, for bond issues aggregating \$384,000,000.

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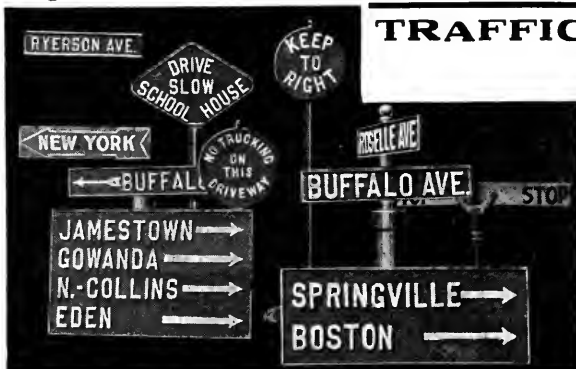
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Municipal Finance

BONDING

ACCOUNTING

TAXATION

Direct Taxes versus Bond Issues*

By William Dodge

Consulting Municipal Accountant

IF it was not in Rome, it was in Athens, and if not in Athens, then in Babylon or some other ancient municipality where the city fathers were gathered, that some one first said:

"There is no science of taxation, there is no justice or equity possible in taxation. The science of taxation is the science of getting the most feathers from the goose with the least amount of squawk."

That is the real problem of the tax-levying authorities, to collect the largest possible amount of revenue with the smallest amount of protest and dissatisfaction on the part of the taxpayers. Many proposed levies are theoretically sound and just, but fail in practical application. Sometimes it costs more to collect a license tax of a specified character than the revenue produced; hence the exemption of incomes of less than \$1,000 annually from the Federal income tax.

The purpose of this paper is not to discuss the broad subject of taxation, but to submit for consideration one feature, applicable to California municipalities* at this time, under the present status of the law.

Most cities are limited by statute or by

their own charters to a tax rate of \$1 for general purposes. The general fund created by the revenues derived from a maximum levy of \$1 on the \$100 of assessed valuation on real estate, improvements and personal property, plus revenues from licenses and miscellaneous sources, is the fund from which it is contemplated all expenditures shall be defrayed. That is to say, an endeavor was made legally to fix an arbitrary limit on the amount of revenue to be raised, or shall we say that it was attempted to fix an arbitrary limit to expenditures for all purposes?

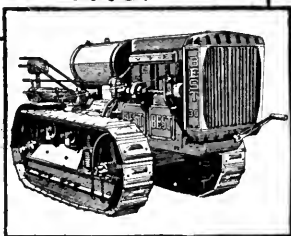
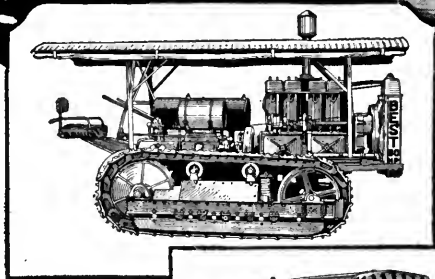
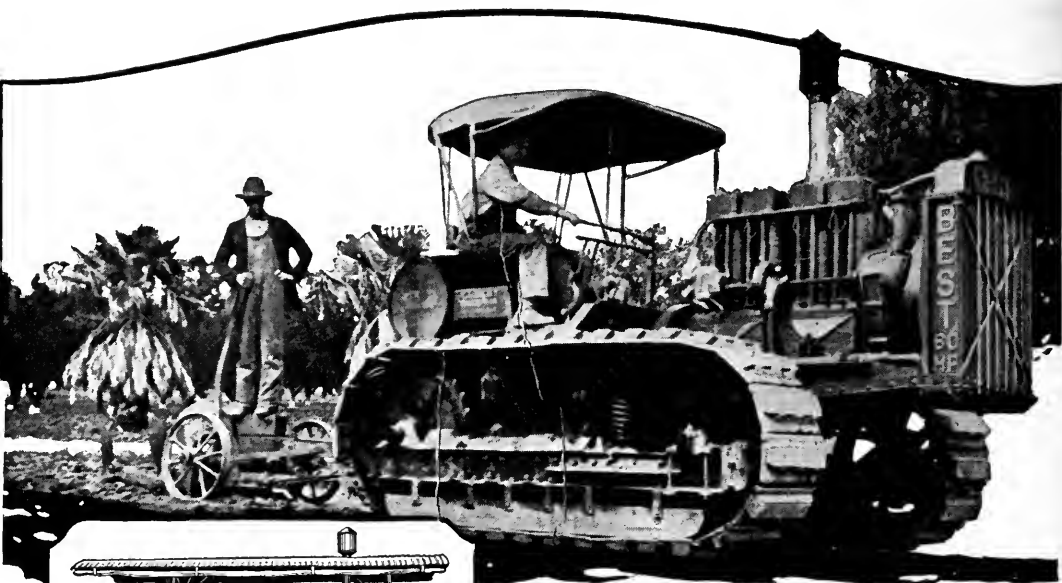
If the latter was the purpose, it failed signally, because the cost of maintaining libraries is specially provided for (with its own limitation) and in San Francisco and elsewhere the necessary revenue for parks and other special features is "outside of the dollar limit."

The "dollar limit" observed according to the letter of the law is violated in spirit by levying license taxes on businesses and vocations which require no police regulation. The only justification for many of these license taxes is the inadequacy of the general fund without these license moneys.

An extra tax burden is placed upon the business man, to provide the additional revenue needed, because the landowner is protected by the artificial and arbitrary "dollar limit." It is all right so long as the goose does not squawk.

Streets that should be improved, bridges that should be built, grade crossings that should be made safe, fire department equipment that should be acquired, land for small parks and playgrounds that should be bought—all these expenditures cannot be defrayed from the general fund, because the general fund is barely adequate to take

*EDITORIAL NOTE.—This paper was delivered before the League of California Municipalities. The constitutions of many states command that the legislature provided for the organization of cities and incorporated villages and restrict their power of taxation, assessment, borrowing of money, etc. Among these states are New York, Wisconsin, California, Michigan, Ohio, Oregon, Nevada, Alabama, North Carolina, South Carolina and Arkansas. Provisions imposing either a debt limit, a tax rate limit or a restriction as to the condition under which debts may be incurred, are also incorporated in the constitutions of Alabama, Arkansas, Illinois, West Virginia, Pennsylvania, Wisconsin, Louisiana, Missouri, Texas, Colorado, North Carolina, Georgia, Maine, California, Indiana, New York, Idaho, Montana, North Dakota, South Dakota, Washington, Wyoming, Kentucky, South Carolina, Utah, Virginia and Oklahoma. These limitations were intended to give a guarantee of immunity from municipal extravagance and incapacity, but the actual effects have been to place many cities under serious and rather artificial financial disabilities.



Tractors Meet the Situation

This is the time when costs for road and street making and maintenance must be reduced to the lowest possible minimum.

Quality is not to be sacrificed. Instead, watchful management will eliminate waste and unnecessary or duplicating efforts. Money will be invested for faster and more thorough methods, requiring less labor—the "effective expenditure on essentials," as Herbert Hoover declares.

One of the most important factors in reducing road costs is a good tractor. The right kind of tractor reduces the required power to small, compact dimensions, easily managed, flexible, and requiring but one man. There is reserve for the tough spots, and no halting for rest. The implement moves steadily forward at the proper depth and speed for best results.

The picture shows a Best "Cruiser" loosening the surface of an oil-macadam road with a seven-point scarifier, twelve inches deep. Best tractors have a wide reputation for long life, dependability and lower operating costs. Why not investigate the tractor question now? Write for full specifications, prices and the name of our nearest dealer.

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care of necessary street repairs, lighting and sprinkling, necessary sewer repair and maintenance, necessary police and fire protection, necessary health and sanitary measures, and the other miscellaneous expenditures of the general government of the city. The "dollar limit" is unscientific. It is arbitrary. It hampers the growth and development of our cities and puts a premium on evasions. Such evasions are the levying of license taxes, the arbitrary raising of assessed valuations, raising or refusing to lower the rates of municipally owned utilities, and so forth. But the simplest evasion, and hence the one resorted to most commonly, is the bond issue.

The Burden of Future Years

If we cannot secure the needed improvements out of the current revenues, out of the general fund, we go before the people with a proposal to incur a bonded debt. The taxes for bond interest and for bond redemption are outside of the "dollar limit." In our personal affairs, in our business affairs, we realize that we must pay as we go, that we cannot live beyond our incomes and ever hope to catch up with our debts. Even our Federal Government, admittedly the only government of a civilized people operating without a budget—even our Federal Government does not hesitate to put an almost unbearable income tax burden upon our shoulders—over four billion dollars annually, about \$40 for every man, woman and child in the country—in order that as a nation we may pay as we go.

But in our cities we are robbing future generations, we are mortgaging our own futures, so that we may have municipal necessities now. San Francisco's growth of population is such that she needs at least one new school building every second year. How can one justify a bond issue for \$100,000 to build a schoolhouse, a forty-year 5 per cent issue, on which the accrued interest will be \$102,500, when a similar schoolhouse is necessary the second year following, and every second year thereafter? Is it not positively wrong to levy a tax for

bond interest and redemption, when one-half of the tax levied directly would produce the needed revenue?

A street improvement is planned because it is necessary. The estimated cost of the necessary improvement is \$6,000. The general fund is inadequate to stand such a drain. Solution! A bond issue for \$20,000 that will improve three times as much street as needs improvement just now—but see how it builds up the town! And see also how it shifts a tax burden along about fifteen to forty years!

In these days of automobile traffic who shall say how long a street will last? Who can tell when your fire-fighting equipment will be obsolete and inadequate? When the automobile park of which you are now so proud will have served its purpose? Our cities, all cities, are growing. Greater and greater and more insistent are the demands made upon the municipal government, and unless there is a lessening of the ever-growing flood of bond issues, state, county and municipal, we shall be staggering under an interest burden that will be intolerable. Even under the California plan of serial bonds, the interest of a forty-year 5 per cent issue just doubles the cost to us of our improvement. At higher rates the cost is correspondingly greater.

There is a way out. There is a "pay-as-you-go" way. That is to go before the voters in a special election—just like a bond election—and to ask for a special tax for a specific purpose, a special tax for one, two, three or even five years. That will save interest, make for economies, and relieve some of the pressure on the "dollar limit" general fund.

Bond issues are necessary and desirable for permanent improvements whose life is forty years or more. Bond issues may be necessary and desirable for the acquisition of public utilities by municipalities, but that excellent financial device, the bond issue, should not be employed to evade the "dollar limit" on general fund expenditures and thus place a double burden on the taxpayer outside of the "dollar limit."

In many English cities thousands of ratepayers are unable to meet the greatly increased local taxes. They are returning tax-slips with the blunt reply: "Can't pay." Cities in this plight include Bradford, Sheffield, Huddersfield, Leeds, Halifax and parts of London. In one city local taxes are 91 per cent of assessed valuation.



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The "Caterpillar's" useful-ness is not limited to snow removal. For road building, working on farm or ranch, in the mining, oil and lumber industries — wherever power and endurance are at a premium, the "Caterpillar" has no real competitor

Through its sure traction and steady, powerful drawbar pull the Holt "Caterpillar"* Tractor is enabling hundreds of municipalities to build and maintain their thoroughfares at the lowest cost. For scarifying or grading streets, cleaning out ditches, bringing up road materials, preparing park sites, hauling away refuse, or bucking snow drifts, no other method is so economical as the "Caterpillar".* No job is too tough for the "Caterpillar"* to handle. It is easy to operate, keeps going in any weather, walks away with any load. Write for actual performance data or let us arrange to exhibit motion pictures showing the "Caterpillar"* doing for other cities what it can do for you.

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The City's Legal Rights and Duties

Information for City Attorneys and Other Municipal Officers, Summarizing
Important Court Decisions and Legislation

Conducted by A. L. H. Street, Attorney at Law

Power of Municipality to Act Beyond Its Boundaries Is Dependent Upon Legislative Grant

In the case of *Mulville vs. City of San Diego*, 192 Pacific Reporter, 702, the California Supreme Court makes a general statement of the law concerning the right of a city to construct improvements and exercise other functions beyond its boundaries. In the course of reaching a conclusion that defendant city was without power to construct a pleasure pier, rock jetties, etc., to extend beyond the limits of an improvement district, the Court remarks:

"In general, a municipality is competent to act beyond its boundaries only in cases in which it is so empowered by legislative authority, and it is necessary, in passing upon the validity of acts of a municipality performed beyond its boundaries, to look to the general laws and municipal charter for the requisite authority. In certain instances, owing to the urgency of extreme expediency or necessity, express authority is dispensed with and the power of the municipality to perform certain acts beyond its boundary is implied as incidental to the existence of other powers expressly granted. Thus, it has been held that, where a municipality has power to construct sewers, it may, as an implied incident to such power, extend the same beyond its boundaries when necessary or manifestly desirable. . . . McQuillin, in his work on Municipal Corporations, states the rule as follows:

"The general rule is that without legislative grant the authority of the municipal corporation is confined to its own area; hence its acts and ordinances have no force beyond its corporate limits. Thus, in the absence of such grant the municipality cannot open a street, repair a highway, grade an avenue, or aid in the construction of a plank road or bridge beyond its boundaries. Sometimes authority to act outside of the municipal boundaries may be implied on the ground of necessity, as, for example, to obtain outlets for sewers and drains. . . . Likewise, a municipality possessing power to supply its inhabitants with water may acquire for that purpose a water-supply without its territory. Certain municipalities have been held to be authorized to supply light and water to points beyond their limits.' (McQuillin on Municipal Corpora-

tions, vol. 4, Sec. 1824.)

"Therefore, in a case of a municipality, power to act outside of the boundaries of the municipality is dependent entirely upon legislative grant; it does not exist unless expressly granted, necessarily or fairly implied in or incident to the powers expressly granted, or essential to the declared objects and purposes of the corporation."

Action of Municipality Upon Petition Not Affected by Subsequent Attempt of Petitioner to Withdraw His Name

Where a properly signed petition has been presented to a city council as a basis for municipal action, without fraud having been perpetrated upon the signers, and where action is taken by the council thereunder—for example, where a paving resolution is adopted in response to petition therefor—the proceedings so initiated cannot be defeated by withdrawal of signatures from the petition. So holds the Nebraska Supreme Court in the case of *Wilkinson vs. City of Lincoln*, 181 Northwestern Reporter, 861, where the Court says:

"Under authority conferred by the city charter, the Council passed a valid resolution approving the petition and ordering the paving. The petition was then legal and sufficient in every respect. It was after the improvement had been thus ordered that plaintiffs withdrew their names. Within the meaning of the city charter, the action of the City Council in ordering the paving was final as to the right of a petitioner to withdraw his name from the paving petition. The right to withdraw the name of a petitioner, in the absence of fraud or of statutory or municipal authority, ended with the resolution. In passing it, the City Council not only acted for all of the petitioners but for all other citizens of the municipality. The validity of municipal acts is not left to the changing attitude of private petitioners. Public policy does not permit a petitioner to invoke municipal power for the public welfare and, by withdrawing his name without specific statutory or municipal authority, destroy the power invoked by him after it has been legally exercised by the City Council. This principle of municipal law is sound and is well established by precedent."



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HANDBOOK OF CONSTRUCTION EQUIPMENT—ITS COST AND USE

By Richard T. Dana, Consulting Engineer, Chief Engineer, Construction Service Company, McGraw-Hill Book Company, Inc., New York City. 1921. XV + 847 pp. Illustrations, diagrams and tables. \$6.00.

The author and publisher are to be congratulated in offering this new book on construction equipment, replacing the Handbook of Construction Plant, which was well known to active engineers and contractors. The book describes practically every type of construction equipment, and gives cost data, arranged alphabetically so that the engineer or contractor need not search through masses of trade catalogs and card index files for specific data on the one machine which he is interested in at the moment.

IMMIGRANT HEALTH AND THE COMMUNITY

Michael M. Davis, Jr., Director, Boston Dispensary. Harper Brothers, New York. XXVII + 482 pp. Illustrated. 1921. \$2.50.

This is the fifth volume of Americanization Studies prepared from funds furnished by the Carnegie Corporation, of New York. The health habits of average city Americans differ widely from those of many immigrants, and it is a serious problem to overcome this disparity by bringing immigrants and health agencies together in a common effort. In this volume, in addition to statistical statements of conditions, ways and means, past, present and future, are presented for bringing about among these immigrants health habits imperative to the safety of themselves and the rest of the community.

ENCYCLOPEDIA OF BUILDING, LOAN AND SAVINGS ASSOCIATIONS

How to Organize and Successfully Conduct Them. Harry S. Rosenthal. Fourth Edition. American Building Association News Company, Cincinnati, Ohio. 1920. XI + 500 pp. Illustrated. \$7.50, prepaid.

This volume embraces such subjects as the origin of cooperative societies, how to organize and conduct them, constitutions and by-laws, forms and books, auditing and supervision, with a variety of practical suggestions.

LOCAL GOVERNMENT IN THE UNITED STATES

Herman G. James, J. D., Ph.D., Professor of Government in the University of Texas. D. Appleton & Company, New York. 1921. XV + 482. \$3.50.

This volume discusses the government of cities, counties, and minor political divisions, from both the urban and the rural aspects. The first chapter is devoted to a brief survey of the local government systems of England and France, the sources for our own and for non-Anglo-Saxon countries, respectively. Local institutions are traced from Colonial times down, and chapters discuss in detail the government of cities, counties, and townships.

IMPORTANT SCHOOL SURVEY

"Know and Help Your Schools." A series of three pamphlets, the result of a survey of urban public schools, directed by the National Committee for Chamber of Commerce Cooperation with the Public Schools, and The American City Bureau. Published by The American City Bureau, Tribune Building, New York. The first of the series relates to salaries, training and experience of teachers; the second, to school buildings and grounds, enrollment and size of classes, and the third, to boards of education, and receipts and expenditures. Single copies 20 cents; 10 or more, 15 cents.

STATISTICAL ABSTRACT OF THE UNITED STATES

Published by the Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C. XIX + 874. 1920. 50 cents.

Complete statistical information of area, climate, population, education, agriculture, forestry, fisheries, manufactures, and mines. Also statistics of labor, transportation, shipping, prices, finance, etc.

HINTS FOR THE POLITICAL SPEAKER

Warren C. DuBois, A.M. La Pidus Printing Company, New York. 1921. 111 pp. \$1.

A brief manual on practical public speaking. Although designed primarily for political speakers, it is well adapted to the needs of others, such as chamber of commerce secretaries, who from time to time are called upon to present their views before public gatherings.

INTRODUCTION TO VOCATIONAL EDUCATION

David Spence Hill, Ph.D., LL.D., President of the State University of New Mexico. The Macmillan Company, New York. 1920. XVII + 483 pp. \$2.00.

A statement of facts and principles related to the vocational aspects of education below college grade. The book is designed to be of service to teachers and students, as well as general readers; it is well suited for use as a text-book on the subject.

WASTE DISPOSAL

"The Municipal Refuse Destructor at Montevideo, Uruguay," by Robert Balmer, Sanitary Engineer. 4 pp. Illustrated. Published as No. 198, The American City Pamphlets, by The Civic Press, Tribune Building, New York, N. Y., 15 cents.

SYMPATHY AND SYSTEM IN GIVING

Ellwood Street, Director, Welfare League, Louisville, Ky. A. C. McClurg & Company, Chicago. 1921. 161 pp. \$1.00.

This book is one of the National Social Science Series. A thorough discussion of "charity." It takes up the questions of administration costs, duplication of effort, unworthy cases, etc. The author points out the necessity of introducing system into philanthropic effort.

The publications listed above are for sale by their publishers or through the Book Department of THE AMERICAN CITY. Those listed below are understood to be free upon application.

THE THIRD-CLASS CITY LAW

Bulletin No. 21, Commonwealth of Pennsylvania. Legislative Reference Bureau, James N. Moore, Director. Compiled by John H. Fertig, Assistant Director, and Elmer S. Welsh and C. C. Breisch. 730 pp.

This volume is a complete compilation of legislation governing the third-class cities of Pennsylvania.

WATER ANALYSIS

"Further Observations on the Eosin-Methylene Blue Agar," by Max Levine, Associate Professor of Bacteriology, Iowa State College, Ames, Iowa. Official Publication, Vol. XIX, No. 45, Iowa State College of Agriculture and Mechanic Arts. 6 pp. Reprinted from the Journal of the American Water Works Association, Vol. 3, No. 2, March. (Apply to author.)

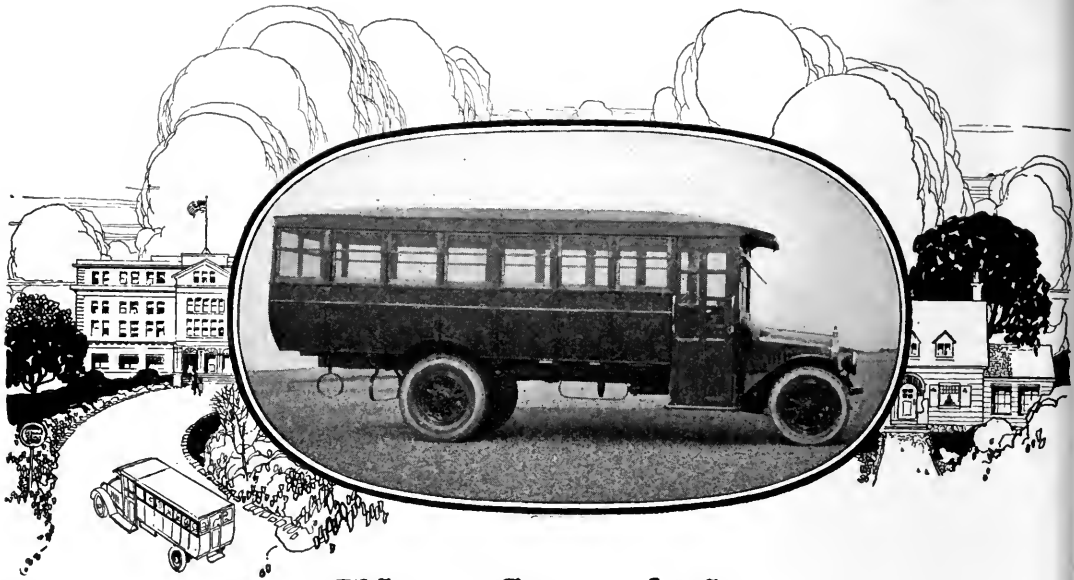
NEWSBOYS

"The Newsboys of Dallas." A study of the boys, their work, home life, schooling, etc. A survey by the Civic Federation. 33 pp. 1921. (Apply to The Civic Federation of Dallas, 415-17 Dallas County State Bank Building, Dallas, Tex.)

MUNICIPAL REDUCTION PLANT

"Operation, Maintenance and Construction of the Municipal Reduction Plant of the City of Chicago." Report of Subcommittee on Waste Disposal of the Committee on Efficiency, Economy and Rehabilitation, of the City Council of the City of Chicago. Together with a report of Irwin S. Osborn, Consulting Engineer. 16 pp. Charts and diagrams. (Apply to James T. Igoo, City Clerk, Chicago, Ill.)

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Portable Tar Kettles

Municipal street departments have found the Style "E" portable tar kettle depicted below and made by the Jos. Honhorst Co., 1016-1020 West Sixth St., Cincinnati, Ohio, to be a very rapid heater, as the entire kettle, bottom and both ends, is exposed to the flame and heat of the fire box. It is equipped with cast iron sectional grates and with fire-box steel liner plates with air space. The ash-pit, which is provided with a bottom, prevents the fire and ashes from



A TYPE OF KETTLE FAVORED FOR ROAD WORK

dropping on the ground and causing damage to paved city streets. The kettle is equipped with large-size, all-steel wheels, 3-inch tires, heavy steel axle, a draw-off valve, and a safety tongue rest, and will heat, melt and boil any bituminous compound used in paving, road building or roofing. It is made in sizes of 50, 75 and 100 gallons capacity.

To Report on Waste Disposal

Samuel A. Greeley, a well-known consulting engineer and a member of the firm of Pearse, Greeley & Hansen, 39 West Adams Street, Chicago, Ill., has been retained by the city of Akron to investigate and report on rubbish collection and disposal.

An Automatic Fertilizer and Insecticide Distributor

The Buckner Manufacturing Company, Fresno, Calif., manufacturers of park and golf course water-distributing devices, are credited with the invention of the machine shown herewith, designed for distributing chemical fertilizers, worm exterminators, weed-killing chemicals and insecticides when used in conjunction with Buckner sprinklers. This machine is fitted with connections for coupling to water hydrants on one side, and to the hose leading to the sprinklers on the opposite side. The reservoir or tank has a screen cage or basket on the inside for holding sulphate of ammonia, nitrate of soda, superphosphate, limes or other soluble chemical fertilizers.

When the apparatus is connected up and in service, the fertilizers are dissolved and distributed over a large area and soaked into the roots of the grasses, where quick results are obtained. Grasses and other vegetation may be given as much or as little stimulant as may be desired during the course of irrigation, eliminating much labor and obtaining results not otherwise possible. Properly arranged valves govern the distribution and make it possible to cut out the chemical-dissolving machine at will.

Grasses can be stimulated without any prepared soil medium, and worms can be exterminated at the same time the fertilizing and irrigating is being done, making a three-fold operation. Insecticides are soaked immediately

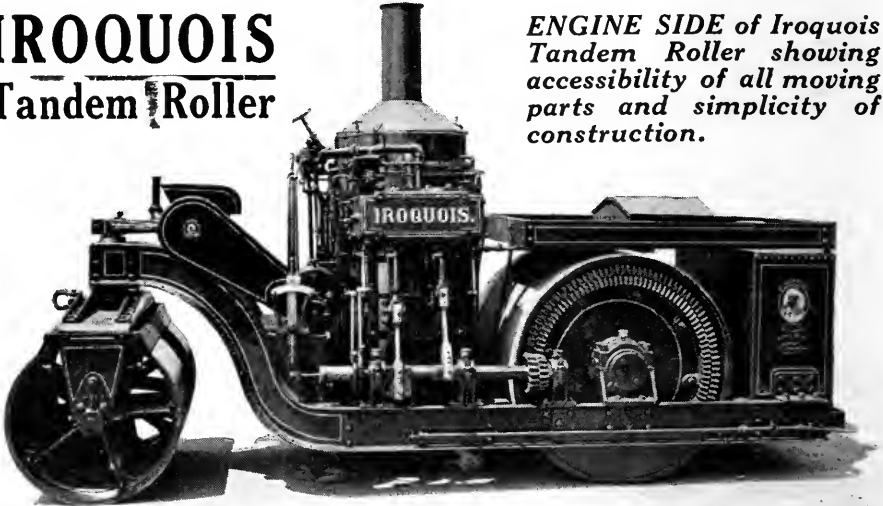


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A telegram will start an Iroquois Tandem Roller enroute to you the same day. You get the best roller made—in the *quickest possible shipping time*. No delay in beginning or completing a contract.

Iroquois Tandem Rollers, like all equipment of the Iroquois Line, are built *specifically* to give long and dependable service at minimum expense. *First cost comes last*.

That is why Iroquois Tandem Rollers are being used by most successful contractors throughout the world—why leading municipalities have adopted them as standard equipment.

Iroquois Tandem Rollers are made in three sizes—2½-ton, 5-ton, and 8-ton—to provide the right type of roller for asphalt, brick, creosote blocks, macadam, grade or golf links.

Why be content with an ordinary roller when you can get an IROQUOIS? Detailed specifications and prices of Iroquois Tandem Rollers and other equipment of the Iroquois Line will be sent on request.



Trade Mark
Reg. U. S. Pat. Off

The Barber Asphalt Paving Company

Iroquois Sales Department

New York Chicago PHILADELPHIA St. Louis Kansas City
Pittsburgh Atlanta

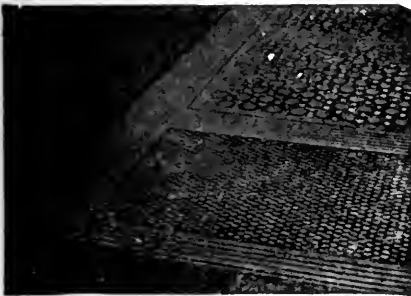
into the worm nests, causing instant death to the casts. This machine may also be used for distributing arsenate of soda and solutions of salt or oils, and for the extermination of grasses and weeds in walks or other places which are to be kept clean. For this operation a simple hose and garden nozzle may be used. This machine has been tested in practice by some of the leading golf course architects, greens keepers and park superintendents in the West, who have pronounced it a great success. Putting greens which have turned pale or brown from want of proper nourishment take on a rich green color within a few days after one application of stimulant distributed by sprinkling.

The Need of Safety Treads

The nation-wide agitation for accident prevention has brought forth new state and municipal laws and requirements. The elimination of the slipping hazard has become essential in all types of structures, and architects, engineers and municipal officials concerned with

Church Street, New York City, manufactures an anti-slip tread for stairs, steps and running-boards, floor inserts and sidewalks. This is called Feralun, which is a metal with abrasive grit embedded in the wearing surface, to provide an approved, durable and effective anti-slip tread for use in place of slippery iron and steel for stair treads, floor plates, trench covers, drainage gratings, expansion joint cover plates, machinery steps and running-boards, door saddles, etc.

For use as a stair tread this material is particularly desirable. It has no heel-catching grooves or projections, and the nosing edge, as well as the entire wearing surface, is anti-slip. The grit embedded in the metal at the time of casting is excelled in hardness only by the diamond, and, while firmly held by the metal partly surrounding each grain, it projects slightly and bites, so that slipping is prevented.



METAL FRAMES OR BORDERS AROUND SIDEWALK LIGHTS ARE VERY COMMON AND DANGEROUS



THE EDGE OF THE STEP, WHICH SHOULD BE SLIP-PROOF FOR SAFETY

construction are urged through these laws to specify for surfaces on which people must walk, only those materials which are made and can be maintained in such manner that slipping will be prevented.

In continental United States in 1917 over 76,000 people were killed accidentally. Of this number, 14,855 were killed by falls, and over half the falls occurred on stairs and floor levels. The number of injured was at least 120 times greater. Approximately \$128,000,000 was the direct loss from this source.

The following table shows the casualties resulting fatally in New York City (Borough of Manhattan) in the four years 1914-1917 from various causes:

CLASS	1914	1915	1916	1917
Automobiles	178	191	215	280
Falls on stairs and sidewalks...	170	128	191	144
Conflagrations	65	26	37	27
Stoves, lamps, bonfires.....	91	56	49	...
Elevators	50	47	39	64
Horse-drawn vehicles.....	95	57	78	52
Surface cars.....	54	41	45	69
Subway trains.....	13	22	16	19
Elevated railroad.....	12	16	8	11

Total 728 584 678 666

The American Abrasive Metals Company, 50

Sanborn Moves Office

James F. Sanborn, Consulting Engineer, formerly located at 37 West 39th Street, New York City, has moved to Room 1862, 50 Church Street, New York City. Mr. Sanborn was Division Engineer on the Catskill Aqueduct New York Water Supply, in charge of the Northern Aqueduct Department, and later in charge of the City Aqueduct Department, where he put the aqueduct into commission for use after the work was completed in 1919.

Error in June Issue

Our attention has been called to an error which occurred on page 563 of the June issue of THE AMERICAN CITY, which bears the caption "A 10,000,000-Gallon Daily De Laval Pumping Unit, Akron, Ohio, Filtration Plant This unit is designed that it may be driven either by an electric motor or by a steam turbine. Sometimes it is a combination steam-turbine-driven generator and pump." While the Akron, Ohio, filtration plant has such a unit, the illustration depicts a high head pumping unit which is not driven by motor at any time.



**DRAINAGE
CULVERTS**
that ENDURE
are
ESSENTIAL

NEWPORT CORRUGATED METAL CULVERTS

Are made of pure iron-copper alloy which by actual laboratory tests has been shown to be the most rust-resisting for this purpose. Newport culverts are made in round and half-round forms to cover all conditions for which culverts may be used.

The proper drainage of the territory on the high side of a road makes it necessary that water be readily removed by a culvert that is permanent, not one which rusts or may be cracked by the first heavy load passing over the road. Newport Culverts resist the load, do not rust and serve faithfully year after year with no maintenance costs.

Send for our literature describing the special features of Newport Culverts.

NEWPORT CULVERT CO.
NEWPORT 542 West 10th Street **KENTUCKY**

The Tractor for the City Park and Golf Course

During the past three or four years the tractor has become a more and more useful, if not a necessary, part of the maintenance machinery of the average municipality, and now a new and very efficient use for it has been found in its adaptation to the maintenance of boulevards, parks and municipal golf courses. Although many types of tractors have been used in town and county road maintenance and road building, tractors of crawler construction of both small and large types have in most cases been the most satisfactory, as they furnish greater traction for operations over soft soil and in the handling of grading and road-building materials over new roads.

The ability of the crawler type tractor for

tors. They are easily installed, the additional cost is not large, and with the tractor they furnish steady, efficient power for the mowing of weeds and grass.

The purchase of tractors for golf course work has until this year been confined mainly to private golf courses. During the present season, however, several municipalities have either arranged to place orders for tractors for golf courses, or have already done so. In considering the tractor for this work, the question which arises in the mind of the average expert on municipal affairs is whether the grouters of the tractor are going to cut and tear the sod. Under some conditions there is danger of this, particularly with heavy tractors, but with a light crawler tractor the only danger is on soft ground, and then only when the tractor is turning, as the ground pressure



GENERAL ARRANGEMENT OF FLEET OF MOWERS BACK OF CLETRAC CRAWLER-TYPE TRACTOR

gaining footage under difficult conditions has brought about its employment as an ideal means of motive power in this new field. So far this work has been confined mainly to the smaller crawler tractors of about 12-20 size, as their ground pressure is light and their size such as to make the handling of the work with this type of tractor most economical.

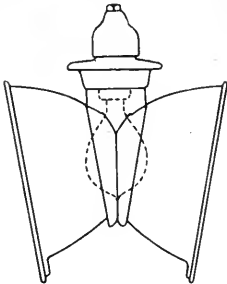
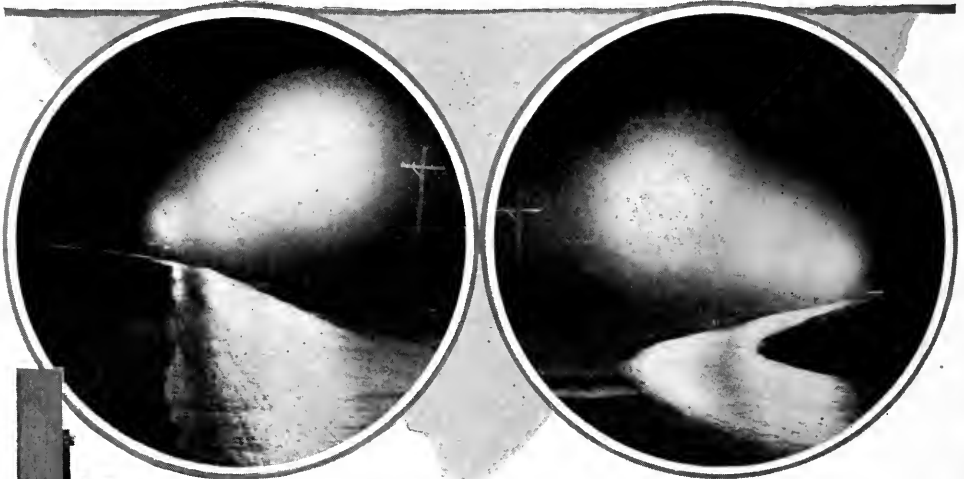
Take, for example, the use of the tractor in the maintenance of municipal golf courses. The light crawler tractor can handle with ease a fleet of the ordinary horse-drawn mowers and cut a swath 15 feet wide. This work can be done at a speed of about $3\frac{1}{2}$ miles per hour, and the tractor, therefore, is able to do the work of from four to six horses in the mowing of fairways with a large saving of time and labor.

In mowing the rough, the tractor has been found equally economical and satisfactory. Several good types of tractor mowers have been developed for use with the lighter trac-

exerted by these lighter tractors is less than $4\frac{1}{2}$ pounds per square inch. Several very satisfactory means have been adopted to overcome this difficulty. For instance, wooden blocks have been made of hardwood and fastened to each shoe of the crawler track. They have been found to last practically the entire season without replacement and do not subtract sufficiently from the pulling power of the tractor to destroy its ability for doing the work.

The use of the tractor on the golf course is paralleled by its equally satisfactory performance in the mowing of parks and boulevards, and if a city is maintaining extensive parkways it is well worth while to compare the tractor and its use with a large fleet of mowers with the horse-drawn or motor-equipped lawn mower. The economy in labor-saving is at once apparent, as a tractor usually substitutes for three of these smaller outfits. It will further be found that the use of fuel and oil by

Highway illumination which lessens headlight glare and shows up the road behind an approaching car is a safety factor not to be neglected.



This fixture with three nested reflectors is the secret of good highway lighting.

Country roads can be made as safe as city streets

From the illuminating engineering laboratories of the General Electric Company has come a new system of rural highway lighting—one that keeps the light on the road, not on the fields or in drivers' eyes.

In each unit, a single lamp with three nested reflectors throws the light downward and along the road. Spacing of 600 feet and lamps as small as 250 candle power (155 watts) give satisfactory service with high economy.

G-E [street lighting specialists at all of our district offices will be glad to furnish further information.

35c-78

General Electric Company

General Office
Schenectady, NY

Sales Offices in
all large cities

the one large unit will be far less than the consumption of fuel by a group of smaller motor-driven lawn mowers, and if horses are used its maintenance cost is, in most cases, less than the actual cost of feeding from four to six horses.

It may be possible eventually to adapt the round-wheel tractor to this type of work. So far, however, it has not been developed to any great extent, as it has been somewhat harder to obtain sufficient pulling power from the wheel-type tractor without the use of the grouser, and if the pull is confined entirely to two wheels the ground pressure of the tractor is greater and the grouser is much more apt to tear up the sod.

With this latest addition to the uses to which a municipality may apply a tractor, the variety of work for which this very efficient piece of motorized equipment is adapted is, in many sections, practically year-round. In spring the tractor may be used for road building, road crowning and road scraping. In summer for this new work on park, boulevard and golf course, and, finally, in winter for the very necessary clearing of snow-blocked roads and sidewalks. The coming of the tractor has worked big changes in the handling of city maintenance work. The savings and economy of tractor use are becoming every day more apparent, and the future will undoubtedly create for it a still greater and more useful field.

Measuring Motor Truck Loads on the Road

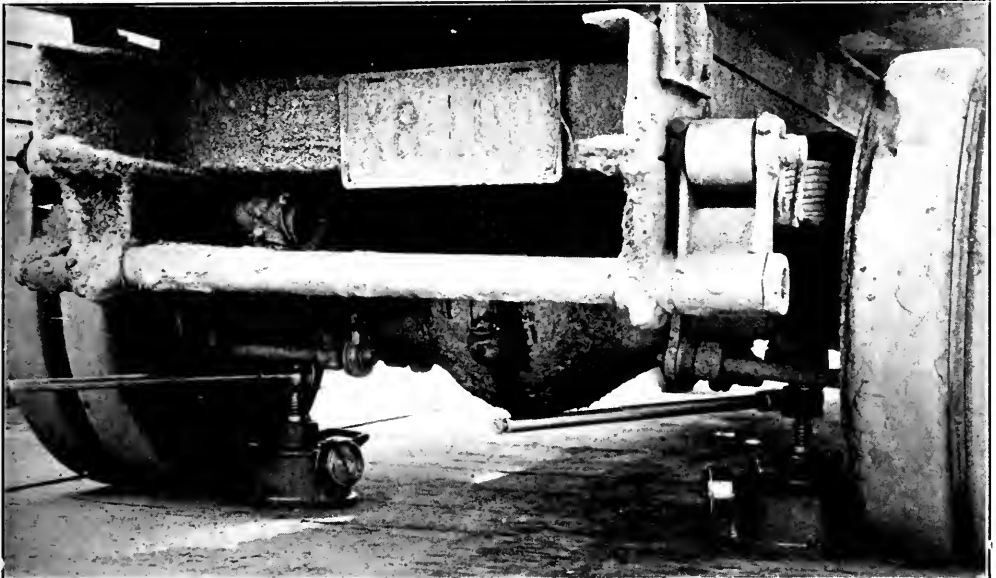
The Loadometer is a portable device made by The Black & Decker Manufacturing Company, Towson Heights, Baltimore, Md., for the

purpose of checking up the load on vehicles on the road without the necessity of running the vehicle on a platform scale. This device is in the nature of a hydraulic jack and is placed under the axle of the vehicle suspected of being overloaded.

A pair of these jacks placed under the rear axle, as shown in the illustration, and jacking the rear wheels off the ground will give the reading of the actual weight carried by these rear wheels. To determine the load on the front wheels it is merely necessary to take a similar reading on the front axle either by an additional pair of Loadometers or by using the same pair after having gotten the reading of the rear wheels.

These devices have been tested thoroughly in mechanical laboratories, and Professor Christy of Johns Hopkins University states that they have an efficiency of over 99.75 per cent. In fact, since their introduction about a year ago these devices have been adopted by road officials of fourteen states and by a great many county and municipal officials. They are also used by the U. S. Bureau of Public Roads.

In communities where loading laws are being enforced, the Loadometer is the only portable device that can be used for checking up these offenders on the road. It is merely necessary for a crew of one or two men using either a motor-cycle and side-car or a small automobile to patrol the road and weigh any truck—anywhere—that appears to be overloaded. The value of this device is readily seen, for overloaded motor trucks have doubtless caused more harm to our highway system than any other single cause, owing to the fact that they have not sufficient tire surface to distribute the load widely enough on the road.



MEASURING THE LOAD ON THE REAR AXLE OF A TRUCK RIGHT ON THE ROAD

THE AMERICAN CITY

MIAMI, FLORIDA



Twelfth St. Night View

ELRECO COMBINATION RAILWAY AND LIGHTING POLES also provide a "White Way" at night. This wonderful street illumination with entire absence of dark spots and shadows is furnished by General Electric Form 9 Novalux Units with Genco Glass Canopies. These units being supported by Elreco Brackets attached to the ELRECO Tubular Poles.

Why not improve your old street lighting and transform the business streets into attractive thoroughfares?

The cost of such improvement is small when Elreco Combination Railway and Lighting Poles are used and the expense divided between the local Street Railway—Lighting Company and the Merchants.

*Our Engineering Department is at your service,
and copy of our Catalog F 2 sent on request.*

THE ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO

NEW YORK OFFICE—30 CHURCH ST.

A Wagon Loader with Creeper Treads

The value of creeper or traction treads for wagon loaders has been appreciated by the George Haiss Manufacturing Company, 143d Street and Rider Avenue, New York City, which has recently equipped its path-digging wagon loader with creeper traction. This machine has been completely redesigned from the ground up and is a heavier, stronger proposition than the wheel-equipped loaders. It is equipped with creepers that are 8 feet long overall and 6 feet between centers. The creepers are of cast steel 10 inches wide and are of the self-cleaning type, so made that they overlap and prevent dirt and foreign matter from clogging the sprockets. The motor is a 15-horse-power General Electric or Westinghouse, and the engine a Waukesha heavy tractor type, developing 37 horse-power at 1,000 r. p. m. It is connected to the countershaft by means of a Baldwin chain and through a gear which drives the elevator and also the wagon loader. The loader has a forward speed of 75 feet a minute, a reverse speed of 45 feet a minute, and a crowding speed of 22 inches per minute. The head shaft is of heavy chrome nickel steel supported by steel take-up bearings, which can be adjusted to take up the slack of the chain. The loader is also equipped with extra heavy buckets with saw-tooth cutting edges. The rear tail shaft is three inches in diameter, squared to receive extra heavy steel lugs on which are bolted the heavy propellers.

This new loader is the outcome of about one year's study and test, and is sturdy enough to practically handle steam shovel work.

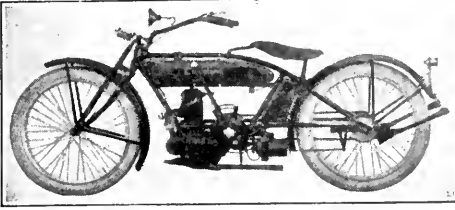
A Gasoline-Driven Fire Pump

The pumping unit illustrated herewith was developed toward the close of the war to be used as a portable pump for pumping out trenches, but before the first order was completed it was cancelled, as it was found that suitable pumps could be obtained in France. The unit performed so satisfactorily on test in the shops of the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., where it is made, that it was decided to make use of pumping equipment of this kind. This company has felt that there should be a ready sale in small towns for units of this type for fire protection purposes, as it can be readily loaded on the back of a light truck or delivery wagon and transported readily, and this would make a considerably cheaper piece of fire protection apparatus than to mount a pump directly on a Ford or similar chassis and would have the additional advantage that the truck could be used for other purposes when it was not required for carrying the pump to fires. When the pumping unit was not in use, it could be put away in the fire station in such a way that the truck could be backed under it; thus the pumping unit could be picked up quickly when occasion required.

The illustration shows the pump which is being furnished, driven in this case by a 2-cylinder engine. In most cases, however, cities prefer a small, high-speed, 4-cylinder, 4-cycle engine, in place of the 2-cylinder engine. The pump itself is a single-stage, double-suction, enclosed-impeller, horizontal pump with a large diameter runner, so as to develop a fairly high head at a safe gasoline engine speed. The



A WAGON-LOADER NEGOTIATING A STEEP PLACE IN A GRAVEL PIT



MOTOR CYCLE Cleveland

**A Low-Priced, Dependable,
Real Motorcycle For Various
Municipal Departments**

THE Cleveland Motorcycle's various distinctive features make it very practical in municipal service such as public park patrolling, water and health department inspection work, etc.

The Cleveland is the acme of simplicity in motorcycles. It has no valves and is the only straight line worm driven motorcycle. Has less parts than the average motorcycle. Weighs only 175 pounds. Has 26" x 3" tires. Travels 75 miles to the gallon of gasoline.

The Cleveland is selling now at the 1922 price. It is very economical of up-keep—and is dependable. Every part is accessible, and the machine is easily ridden and controlled by the novice.

Consider the Cleveland.

**Price \$225
Electric Lighting Equipment,
\$35 Extra.**

**CLEVELAND MOTORCYCLE
MANUFACTURING CO.,
Cleveland, U. S. A.**

7th Year



Steel FLAG Poles

**Our
Exclusive
Specialty !**

*Write for Catalogue showing
Ground Set,
Roof and Window Poles
17-200 ft. high.*

**POLE & TUBE
WORKS, Inc.**

**Avenue D and
Murray St.,
NEWARK, N. J.**



THE CALIFORNIA BENCHES

Patented 1913-1914-1916-1917-1921-and pending

These benches are a high class finished product, the above being one of seven refined designs originated by us. The seat and back are of two by four clear wood properly finished and fastened through the concrete ends with wooden wedge pins.

In order that Park Boards and individuals may now obtain this fine product at commercial prices everywhere, we have arranged that local concrete products manufacturers in various districts of the country may obtain the Patent Rights and the perfected iron molding machines for same at reasonable cost.

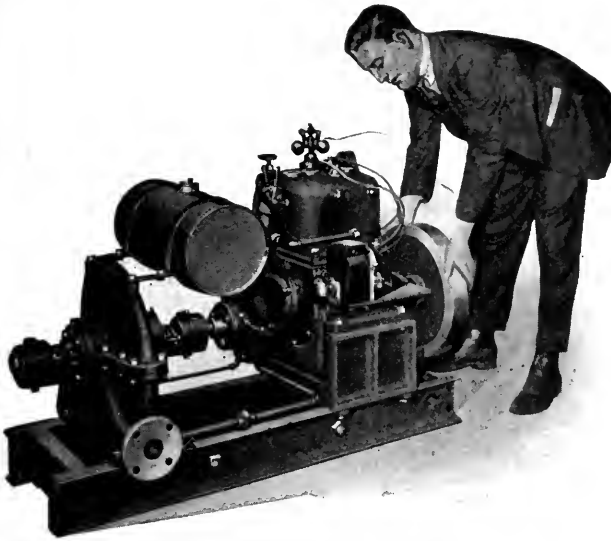
Hundreds of these benches are in use by the Cities, Parks, Resorts and Universities, famous upon the Pacific Coast, and their utmost utility, permanence, and attractiveness appeals to all.

Your valued inquiry might include name of a local firm, or we will endeavor to establish its manufacture through your Chamber of Commerce or advise you nearest factory.

ART CONCRETE WORKS

Originators and manufacturers for 35 years.

340-364 So. Fair Oaks Ave., Pasadena, Cal.



A PORTABLE UNIT FOR FIRE SERVICE AND OTHER EMERGENCY WORK

unit is not an experimental proposition. Although few are in use at present as fire pumps, a large number are in service for various other kinds of work, such as: general service for water-supply in small towns pumping to tanks or reservoirs, or similar service in filling tanks for factory and mill water-supply; irrigation on small farms, or drainage of small areas; pumping out cofferdams, pits, excavations, etc., where there is not much foreign material in the water to be pumped; mounting on the back of a truck with a large water-tank for

street flushing; as an emergency stand-by unit for an electrically driven or other type of pump.

It will be noticed that the structural steel base plate of the pumping unit has holes through the frame members, and pipes could be inserted through these holes to facilitate handling the pumping unit by several men, as the pumping unit would have to be taken out of the truck at the points where it would be used, and placed on the ground in a level position.

Portable Voting Houses

In many voting districts in American cities the increased number of voters, through the passage of the Equal Suffrage Amendment, has outgrown the voting space and some additional space must necessarily be provided so that voters will not be held in line awaiting their turn to cast their ballots. The Kolb Building Company, 30 Church Street, New York City, manufactures a portable voting house, in either wood or steel-covered construction. The type generally used measures 12 by 24 feet and can be erected or taken down without injury in a few hours' time. Provisions are made for ample ventilation and light. One of the particular features of these houses is that they require little storage space and can be used by other municipal departments when not in



PORTABLE VOTING BOOTH FOR DISTRICTS WHERE THE INCREASED NUMBER OF VOTERS NECESSITATES MORE VOTING SPACE

UNION METAL LAMP STANDARDS

Good Lighting and Safety Go Hand In Hand

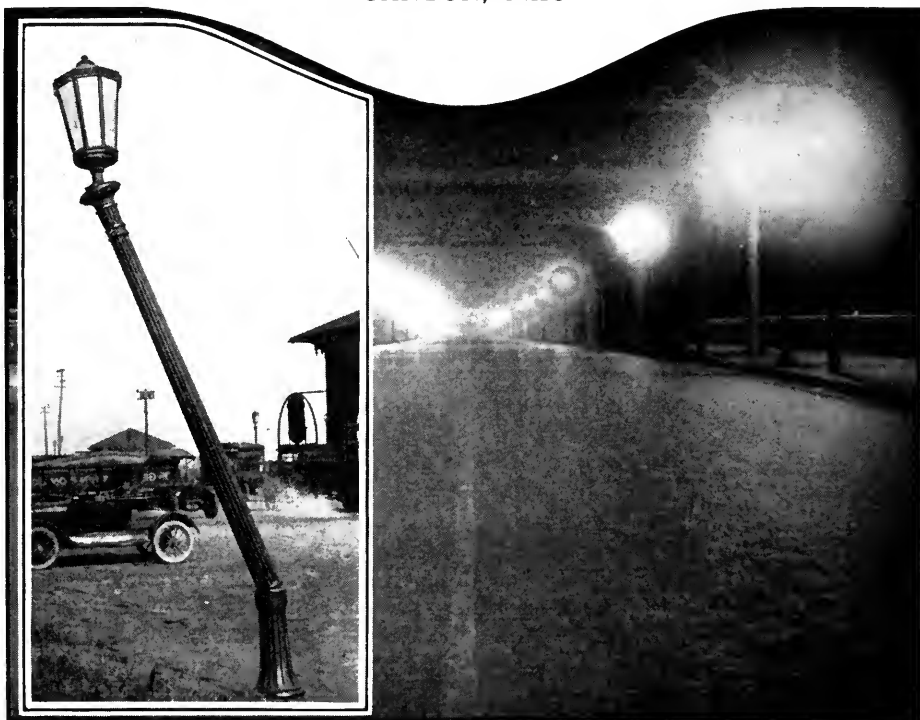
Heavy increase in motor traffic during the past five years has emphasized the demand for safe and dependable lamp standards:—for standards that take the punishment and absorb the shock and strain thrust upon them by curb collisions.

Union Metal Pressed Steel Standards fully meet this grave responsibility and insure against deaths, accidents, and damage suits due to falling lamp posts.

Below is a typical photograph showing that Union Metal Lamp Standards are strong, tough, and practically unbreakable when subjected to heavy impact from a truck. They have great strength where and when it is needed:—they are the pinch hitters of the lighting standard business.

Standards of lower quality jeopardize life, property, glassware, lamps and cable connections, and finally emphasize the desirability of installing Union Metal Standards where they must withstand impact, where it is desired to eliminate breakage and where safety is essential.

**The Union Metal Manufacturing Co.
CANTON, OHIO**



A Union Metal Lamp Standard at the D & C and C & B Boat Dock, Cleveland, struck by a truck. Damage was so slight that the lamp burned for several nights after the collision.

use by the election board.

The city of New York uses a number of these voting houses and they have been found very satisfactory, according to the President of the Board of Elections, particularly in the residential section on the upper West Side of the city. They are also in use in Albany, N. Y., in places where it has been difficult to obtain suitable locations for the polls in existing buildings.

Connery Again on Production Basis

Connery & Company, 4000 North Second Street, Philadelphia, Pa., have just completed the reconstruction of their plant after its partial destruction by fire, and are again on a production basis, having a stock of over 600 kettles of all styles, ranging in capacity from 10 to 500 gallons. All Connery heaters are double electrically welded throughout and are guaranteed not to leak. A few of the styles are also constructed with the new patented steel rib which has eliminated buckling sides on certain types of construction.

Interesting Test of Light-Weight Fire Pumper

The increasing use of light-weight fire pumps mounted on standard commercial chassis has made the following test of standard equipment particularly interesting to prospective purchasers of this type of fire engine. A recent test of a Reo triple combination pumper with full equipment, furnished by the O. J. Childs Company, Utica, N. Y., gives an interesting idea of the work which this type of machine can perform. The machine was located on a bridge, taking a draft of 19 feet from the river. The water was pumped through 550 feet of 2½-inch hose up a hill from the bridge 25 feet high, and with the use of a ¾-inch nozzle 140

gallons per minute were obtained at 55 pounds nozzle pressure. With two streams, one through a hose 350 feet in length and the other 250 feet in length, and each hose equipped with ¾-inch nozzle tips, the total discharge was 352 gallons per minute, producing two good fire streams.

The photograph below shows a Childs double tank combination chemical engine and hose car, mounted on a 1921 Atlas chassis, which is in use at South Whitehall, Pa.

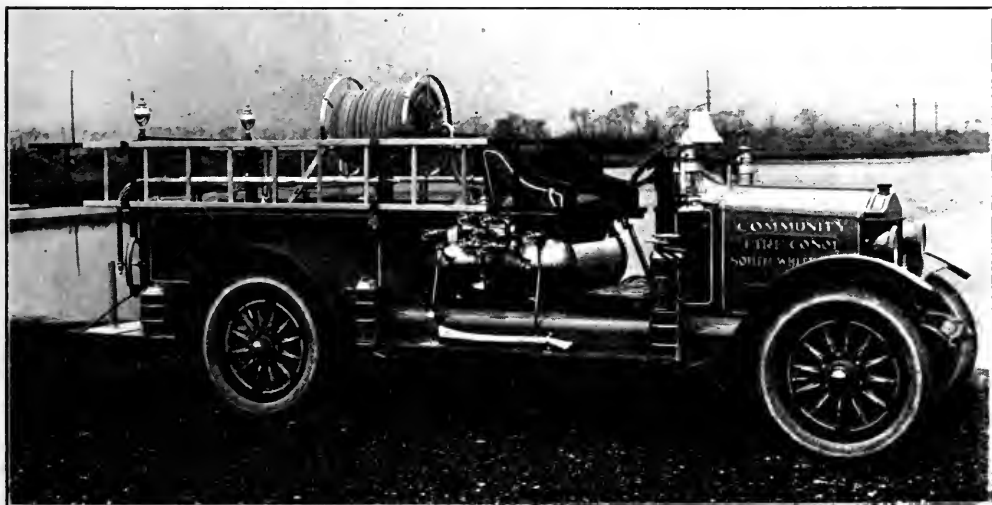
Good Roads Machinery Moves Office

The Good Roads Machinery Company on June 25 moved its general sales office from 821 Bulletin Building, Philadelphia, Pa., to Kennett Square, Pa. All municipal officials and contractors corresponding with the company after that date should address letters to Kennett Square, Pa.

Stutz Opens K. C. Branch

The Stutz Fire Engine Company, of Indianapolis, Ind., has just opened a western branch in Kansas City, Mo. James G. Matheny, who is the manager of the new office, is well-known, having been connected for several years with the Kansas City branch of the Seagrave Fire Engine Company.

The new office carries a full line of display machines, including combination hose and chemical car, a service or hook and ladder car, and a pump capable of delivering 750 gallons per minute. Approximately \$50,000 has been invested in this western branch, which will control sales chiefly in the southwestern states, including Idaho, Iowa, Wyoming, Nebraska, Missouri, Kansas, Colorado, Oklahoma, New Mexico, Texas, Arkansas, Louisiana and Mississippi.



CHILDS EQUIPPED ATLAS CHASSIS FOR THE SOUTH WHITEHALL, PA., FIRE DEPARTMENT



Alba Installation, "Gary," Indiana

Ornamental Street Lighting with Alba Globes

is profitable municipal investment.

It increases property values by making a city more attractive to live in and by drawing trade. It costs no more than old fashioned, inefficient, unattractive lighting.

Alba is the best glass for all lighting uses. It diffuses the greatest quantity of usable light—absorbs least—and makes illumination uniform and agreeable.

Street Lighting Suggestions

City officials, civic organizations and any one else who is interested in good Street Lighting can secure information and literature upon request to our Street Lighting Department.



Registered
U.S. Pat. Off.

Macbeth-Evans Glass Company PITTSBURGH

New York

Chicago

Philadelphia

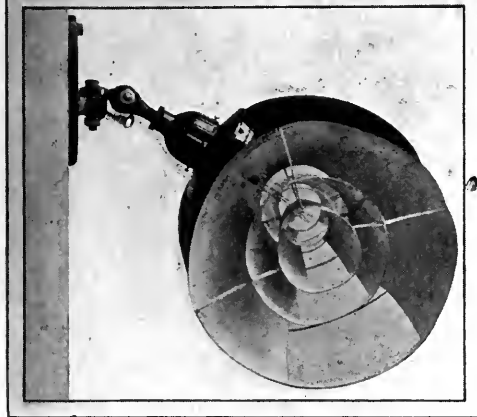
Boston

San Francisco

Macbeth-Evans Glass Company, Ltd., Toronto



DAY AND NIGHT VIEWS OF THE NEW COUNTRY HIGHWAY LIGHTED WITH INCANDESCENT LAMPS AND NEW REFLECTOR SHOWN BELOW



Illuminating Country Highways with Parabolic Nested Reflectors

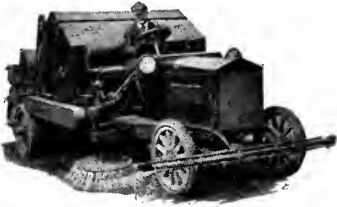
A great many of the automobile accidents which occur at night are credited to the glare of automobile headlights, which is not eliminated by many of the types of reflectors and lenses used in the lamps. The General Electric Company, Schenectady, N. Y., has devised a simple and economic method for illuminating highways, so there will be no more need for glaring headlights on country roads than on city streets. The new type incandescent lamp reflector has been developed after months of study and experiment. The test installation at Swampscott, Mass., which has been inspected and approved by many officials interested in highway safety and illumination, has been pronounced successful, for it provides a well-lighted highway without a great waste of illumination on the adjoining fields. An incandescent lamp of 250 candle-power is all that is needed on these reflectors. They are placed at a height of 30 feet at distances from 400 to 600 feet apart, to illuminate the roadway so well that there is no need for glaring headlights.

This new type of reflector, known as the parabolic nest highway lighting unit, embodies an entirely new and distinct feature for collecting the light rays and casting them only where needed. Engineers have spent years studying schemes to prevent the illumination of fields adjoining roadways and yet have a light

that would properly illuminate the road and do away with glare. A nest of reflectors, or a series of three, one within the other, is the outstanding feature of the new unit. There are similar openings on either end, and by this means the greater part of the light which would be lost under ordinary conditions by reflecting upward and out to the adjoining fields is collected and cast in either direction upon the road surface. The rays which would escape if only the one reflector was used are picked up by the inner reflectors and directed toward the roadway at an angle of 10 degrees below the horizontal, giving the same effect as an overhead reflector 15 feet in diameter. The white reflecting surfaces of the unit reduce the glare from the incandescent lamp without the aid of diffusing globes. The fixture also affords a much better projection to the globe than is offered by the type of reflector now found on some highways on the outskirts of cities. The bracket holding the reflectors is adjustable in both the vertical and the horizontal direction, so that the fixture can be mounted on poles close to the edge of the highway or on others which may be back many feet and can also be turned so as to illuminate curves and hillsides. In other words, the opening in the lower part of the reflector can be kept practically parallel and in line with the road surface under any conditions.

Several communities have already become interested and plan installations of the new lights for short distances, and it is believed that when the decided advantages of better light for country roads are actually seen, a step in soliciting the help of states and counties for country road illumination will be taken.

The illustration herewith shows Paradise Road, Swampscott, Mass., where the original experiments were carried out. The left-hand illustration shows the road in the daytime with the left-hand curve in the distance. The right-hand picture shows the same road at night with the curve ahead well illuminated, the road readily seen, without glare, and the fields comparatively dark. The lower illustration at the left shows one of the nests of parabolic reflectors as seen from below.



Austin Motor Sweeper

CLEANER STREETS for LESS MONEY

That's what the Austin Motor Sweeper gives you.

Correctly designed and substantially constructed, it stays on the job day and night if necessary; cleaning thoroughly from curb to curb and saving time labor and money.

The new Austin Motor Sweeper Catalog "G" is just off the press and should be in your files.

WRITE FOR YOUR COPY TODAY



The Austin-Western Road Machinery Co.
CHICAGO

BRANCHES IN 22 CITIES

"Everything from a drag scraper to a road roller."



IMMEDIATE SHIPMENT OF TAR AND ASPHALT HEATING KETTLES CONNERYS' NON-LEAKABLE WELDED—"HELD BY THE WELD"

**20 STYLES
10 to 1000 GALLON CAPACITY**

Constructed for Service and economy. Our most complete stock enables you to obtain any size and style of Heater you require.

Kettles for class of fuels.

Construction and repair work require them.

We stock them.

Our stock—Your Service.

Write for Catalog and prices.



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Municipal Improvements in the Panama Canal Zone

By Jay J. Morrow

Governor of the Panama Canal

TO-DAY a Northerner whose business requires him to travel or live in the American tropics may leave home without feeling that he is going into an exile of danger and intolerable discomfort. Sanitation and municipal improvement are gradually transforming the towns of the West Indies and Central and South America. The disease risk is no longer excessive. "Pest holes" and "plague spots" have disappeared, and the average stand-

ard of comfort rises from year to year. In this transformation the Panama Canal Zone has led the way, and the towns of Ancon-Balboa and Cristobal and the smaller settlements and Army posts on the Canal are still models of what can be done to make the tropics safe, comfortable and attractive.

The healthfulness and beauty of these towns rest on a solid basis of municipal engineering. One of the first tasks of the Isthmian Canal Commission when it took



ROAD SCENE NEAR THE GOVERNOR'S RESIDENCE, BALBOA HEIGHTS, CANAL ZONE

over the property of the French Canal Company in 1904 was to install a modern water-supply and sewerage system in the terminal cities of Panama and Colon and the adjacent sections of the Canal Zone. These systems have been improved and extended as the exigencies of Canal construction and the growth of the communities served have required.

Water-Supply

The water-supply system as it exists today was described in the September, 1920, issue of *THE AMERICAN CITY* by George C. Bunker, sanitary engineer. There are three plants in operation, one supplying the communities on the Pacific side, and two those on the Atlantic.

The first draws water at Gamboa at the southern end of Gatun Lake, whence it is pumped over the continental divide through 30- and 36-inch cast iron mains to a purification plant at Miraflores 11.3 miles distant. Here the water is aerated, treated with alum and run through rapid sand filters of the gravity type. The equipment of the plant and the processes used were described in the article mentioned above. From Miraflores the water runs by gravity through cast iron mains of 30-, 20- and 16-inch diameter to a pumping station at Balboa (3.97 miles distant), where it is raised to a low- and a high-service reservoir built on spurs of Ancon Hill. The high-service reservoir is used to supply water to the more distant points on the distribution system and to secure additional pressure for fire fighting. The normal pressure maintained by the low-service reservoir is 40 pounds per square inch. In case of fire, water can also be pumped directly into the mains, and the pressure increased to 110 pounds. The capacity of the Miraflores purification plant is 17,000,000 gallons a day, and the average daily consumption in the district supplied is approximately 10,000,000 gallons. This consumption includes water sold to vessels using the Canal or the port of Balboa, which is charged for at the rate of 50 cents per 1,000 gallons.

On the Atlantic side water is drawn from the Brazos Brook reservoir and purified at Mt. Hope, whence it is pumped into mains supplying Cristobal, Colon, Mt. Hope and Margarita Point. The capacity of this plant is 8,000,000 gallons a day, and the average daily consumption about 6,000,000 gallons.

As on the Pacific side, a part of this consumption represents sales to vessels.

A smaller plant at Agua Clara supplies approximately 1,000,000 gallons of filtered and disinfected water to the Gatun District and the fortifications at Toro Point.

Sewers

There are no peculiar features about the sewers of the Isthmus; but the systems are complete. Vitrified pipe of 6-, 8-, 10- and 12-inch diameter, vitrified and concrete pipe of 15-, 20- and 24-inch diameter, and concrete box sewers ranging in size from 2½ by 2½ feet to 8 by 8 feet have been used. At Cristobal-Colon, which is constructed on filled-in land at a minimum elevation above sea-level, sewage is discharged into a sump, from which it is pumped out into the bay. At Panama-Ancon-Balboa a gravity system was installed without difficulty. At all points on the Isthmus special provision had to be made to take care of the extraordinary run-off of surface water following the tropical rains.

Roads

Road-making methods on the Isthmus have been greatly modified as a result of experience with local difficulties and to meet changes in traffic conditions. In the early days of Canal construction the cities of Panama and Colon were paved with vitrified brick, which has worn well under heavy traffic.

The first wagon roads in the Canal Zone were of water-bound macadam located on the contour system. These roads deteriorated very rapidly even under light horse-drawn traffic, and maintenance costs averaged 25 cents a square yard per annum. They served their purpose as quickly built highways of low first cost, connecting the temporary settlements of the construction period; but this type of road has been abandoned. It is not adapted either to the climate, with its alternating seasons of drought and heavy rainfall, or to the motor traffic of the present.

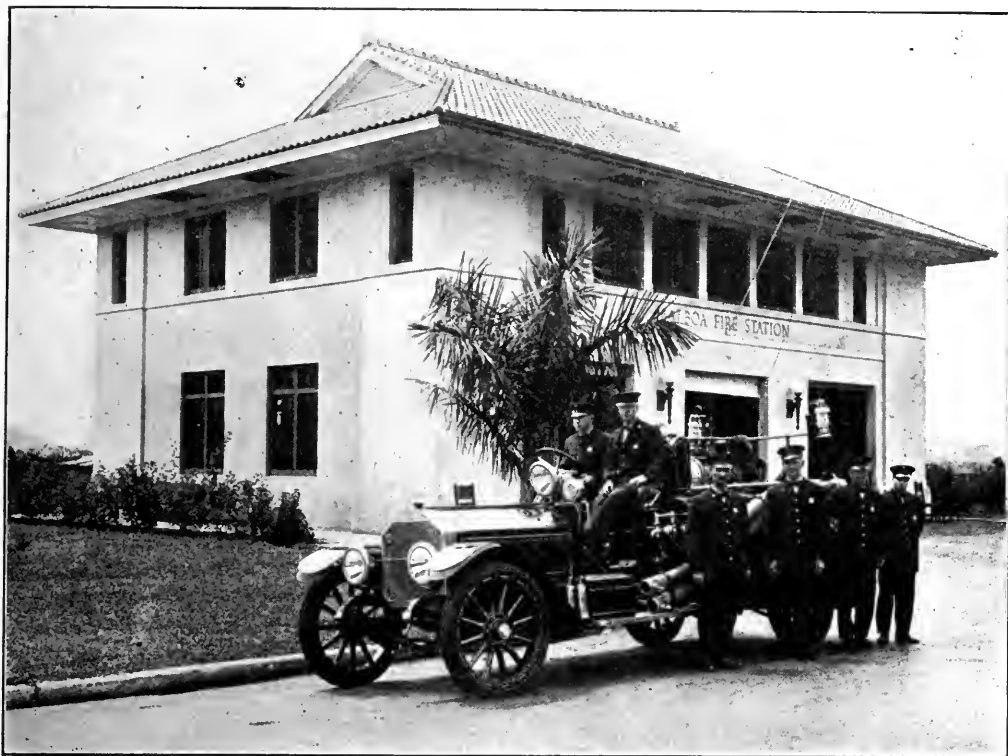
In the permanent town site of Balboa a Telford base road was used, built between concrete curbs and gutters. The specifications called for a base of a minimum of 10 inches of hand-placed stone set on edge, topped by a wearing surface of 2½ inches of concrete asphalt. This has proved an excellent road, and the cost of maintenance

over a period of five years has not exceeded 4 cents per square yard per annum. Later experiment has led to the adoption of a road with a concrete base 5 inches deep at the sides and 6 inches at the center with a top layer of 2 inches of asphaltic concrete. This road is considered the most satisfactory yet devised for the Isthmus. In all road work it has been necessary to make most careful provision for drainage. The

enclosed in a spherical polycased or Alba globe 14 inches in diameter. The mounting height of the lamps is 10 feet 3 inches from the ground. The lamps are connected in series and operated on a current of 6.6 amperes.

Fire Prevention

Fire protection is directed primarily to prevention. All permanent buildings are of concrete and tile construction with tile roof-



CONCRETE FIRE STATION WITH AMERICAN LA FRANCE APPARATUS, BALBOA, PANAMA CANAL ZONE

construction of the Diablo Road of this type was described in the July, 1921, issue of THE AMERICAN CITY.

Street Lighting

In the permanent street lighting systems installed throughout the Canal Zone the lamps are supported on ornamental cast iron posts of a type used at Washington, D. C., and designed by the late Frank Millett, member of the Fine Arts Commission. Current is supplied through underground cables. The posts are spaced approximately 175 feet apart, and each bears a single nitrogen-filled lamp of 100 candle-power

ing and are arranged throughout with regard to practical fireproofing. Regulations require a minimum space of 50 feet between frame buildings of one story and a space of 100 feet between higher frame buildings. Special rules cover the construction of garages, storehouses, etc. Wiring, plumbing, setting of stoves, etc., are all under close regulation. Grass must be kept cut in the neighborhood of buildings, and accumulations of scrap paper and other rubbish are forbidden. The rules are enforced by daily inspections.

There are paid fire departments at Cristobal and at Balboa with substations at



THE PRADO, BALBOA, A BOULEVARD EXTENDING FROM THE ADMINISTRATION BUILDING TO THE Y. M. C. A.

Gatun and Pedro Miguel, adequately manned and equipped with modern motor-driven apparatus. At smaller settlements fire hose and extinguishers are maintained for the use of volunteer fire companies, which are instructed and drilled at regular intervals. Fire hose and extinguishers are also maintained at all points which are not easily accessible to motor fire apparatus. The Atlantic and Pacific terminals of the Canal each have two harbor tugs equipped with fire pumps, hose and deck nozzles for the special protection of water-front property. Gamewell fire alarm systems with street boxes are in operation at Cristobal, Balboa-Ancon and Gatun.

In recent years fire losses in the Canal Zone have been almost negligible; but on vessels using the Canal or the terminal ports a number of destructive fires have occurred, to combat which assistance has been rendered by the Fire Department.

Landscape Gardening and Town Planning

The Isthmus of Panama, with its miniature mountain ranges clothed in forest green, is preëminently a land "where every prospect pleases," and the corollary that "only man is vile" is inapplicable. On the contrary, the monumental examples of man's handiwork compel respect for the power of organized human effort. While in all the units of the Canal plant, utility has been the dominant aim, esthetic

possibilities have not been slighted. The locks are not only massive and imposing, but they have a beauty of design as well. The Administration Building at Balboa Heights is a beautiful structure in a setting of supreme beauty.

When the permanent town site was laid out at the Pacific terminal, the opportunity for landscape gardening on the terraces and spurs of Ancon Hill and on the flats below was too obvious to be overlooked. The scheme of streets, plazas and winding roads and the grouping of buildings were planned carefully with an artistic effect in view. Finally, the labors of the gardener have added the finishing touches to the scene. Green lawns have been sodded and brought to perfection, hedges of tropical Crotons; Hibiscus have been planted to conceal kitchen entrances, clothes-lines and the unsightly pillars on which the dwelling-houses are raised for ventilation. Red and purple flowering Bougainvillea vines have been trained over type houses which would be monotonous in the uniformity of their outline. They relieve the white glare of the concrete walls and give privacy to screened verandas.

Trees

The original shade trees have been carefully preserved, and new trees have been planted which grow with remarkable rapidity in this warm, moist climate. All of this work has been done according to

a considered plan. A parklike effect has been aimed at, with open vistas, to the avoidance of the close confusion of the jungle into which native vegetation lapses when left alone or indiscriminately cultivated. Many of the trees and shrubs used are indigenous to the Isthmus, but a great number are exotics transplanted from other and distant tropical countries. Among the most beautiful are the mango, often of great height and spread of limb, with dense foliage—an unequalled shade tree; the straight and stately royal palm, lining the sides of formal avenues; the Poinciana with its fernlike leaves and scarlet blossoms;

the Croton, the frangipani, the banyan from the Far East, the star apple, the wild fig, the wild almond and the bamboo.

Most of the different species were planted by the French in the grounds of Ancon hospital, which have long been a tropical garden of some pretensions, and have served as a source of supply for plantings elsewhere. A nursery is now operated by the Panama Canal at Ancon, which not only supplies the needs of the Isthmus, but makes sales to visitors from neighboring countries, who are impressed by the beauty of the Canal Zone grounds and eager to duplicate it at home.

Typhoid Fever and the Chlorination of Drinking Water

A REPORT which has recently been made by Dr. R. G. Perkins, of the Division of Health, Cleveland, Ohio, brings out very forcibly how a community, by a too strenuous protest against an unpleasant but transitory condition, can condemn itself for years to an annual recurrence of disease.

Cleveland obtains its water through two cribs placed $4\frac{1}{2}$ miles out in Lake Erie and delivers it through two pumping stations, at one of which it is filtered and at both of which it is chlorinated. Chlorination was begun in 1911, when the growth of the city and the increasing pollution of the lake water made treatment essential. After numerous experiments, the dose of chlorine necessary to make the water safe was determined. This amount was added, and the curve of typhoid cases fell with unusual sharpness. Unfortunately, conditions compelled the delivery of the treated water through the mains in some parts of the city so shortly after the chlorine had been applied that it still tasted of chlorine.

Much complaint followed, but it was dying out when early in 1912 a flood in the Cuyahoga River, which enters the lake at Cleveland, carried sewage and trade wastes out into the cribs, through which they reached the city mains. The trade wastes gave to the water an unpleasant taste, which was promptly blamed on chlorination by

most of the consumers. The Mayor at that time gave in to the protest, and by his order the dose of chlorine was reduced, and during the ensuing nine years it has never been high enough, according to Dr. Perkins, to fully counteract the ever-present pollution of the raw water.

The typhoid bacillus in drinking water is very difficult to find by laboratory methods, but the finding of sewage pollution is always considered as a warning of its possible presence. In 1918, in the effort to better conditions, a filter plant was put into service at the larger pumping station, which handles nearly three-fourths of the city consumption. Laboratory tests, however, show that sewage pollution is present in the unfiltered water in the city mains nearly half the time, and in the filtered water from 8 to 22 per cent of the time.

In 1918 and in 1920, when these tests showed the water to be badly polluted, the number of cases of typhoid fever in the city which could not be traced to any cause other than the water was double the number of that occurred in 1919, when the tests showed the water to be much better. From this the report argues that the pollution of the water and the amount of typhoid fever are directly related and that when the pollution is reduced to a minimum, as it can be by existing facilities, typhoid fever in the city will be greatly reduced.

What Does Your City Pay for Health Service in Schools ?

Investigation of Cities of Over 8,000 in the United States Shows Pitiable Expenditures for This Important Work

IN the third report of the investigation directed by the National Committee for Chamber of Commerce Coöperation with the Public Schools, and the American City Bureau, published under the title, "Know and Help Your Schools," there appears a table giving the groups of cities which have replied and the amount of money spent in each group for health service out of each \$100 of current expense. We have reproduced this table below.

The totals given include the entire expenditure for medical inspection and dental and nurse service in these cities. The total for all cities reporting, which represents 64 per cent of the population of the country, in cities of over 8,000 population, is \$1,341,000, or only 46 cents for each \$100 of current expense—less than one-half of 1 per cent. There is a notable variation in these amounts in the various geographical groups. In the Western cities it is only 29 cents per \$100, in the Great Plains cities it is 84 cents—nearly three times as much. In the Great Lakes cities it is 36 cents, in the Eastern cities 48 cents, and in the Southern cities 64 cents. In the size groups it is 37 cents for the large cities, 70 cents for the small cities, and 82 cents for cities of 30,000 to 100,000 population.

How small this expenditure really is may be better understood if one compares it with the expenditure for teachers' salaries. For every \$64.12 spent for teachers' salaries, 48 cents is spent for health service, or about \$12 for health service to every \$1,600 for teachers' salaries. This means that the schools of American cities are spending for health service less than \$12 annually upon each group of children allotted to one teacher. In terms of the amount per pupil, the expenditure is less than 35 cents per

year. If this health expenditure were confined to nurse service alone, eliminating the more expensive medical inspection and dental service, the total amount would supply one nurse for not fewer than 4,000 children. In other words, this total expenditure allows less than one-third of the minimum amount needed for nurse service alone, with absolutely nothing provided for medical inspection and dental service.

CURRENT EXPENSE AND EXPENDITURE FOR HEALTH SERVICE IN SCHOOLS OF THE UNITED STATES

CITIES	Current Expense	Health Service	Amount for Health Service Out of Each \$100 Current Exp.
Small, Eastern..	\$10,348,031.84	\$88,713.65	\$0.86
Small, Southern.	2,868,711.65	11,531.26	0.40
Small, Great Lakes	9,095,028.33	61,322.62	0.67
Small, Great Plains	6,088,056.73	49,283.00	0.81
Small, Western.	4,038,792.24	17,452.49	0.43
Middle, Eastern.	16,164,371.70	140,788.30	0.87
Middle, Southern	2,863,511.04	30,784.67	1.08
Middle, Great Lakes	12,095,249.02	89,662.50	0.74
Middle, Great Plains	6,024,960.80	38,356.45	0.64
Middle, Western	4,431,362.80	39,573.55	0.89
Large, Eastern..	106,070,095.69	408,401.87	0.39
Large, Southern.	12,788,563.83	75,934.53	0.59
Large, Great Lakes	48,391,800.75	98,920.77	0.20
Large, Great Plains	17,074,624.95	157,069.34	0.92
Large, Western.	22,600,325.48	33,227.17	0.15
Eastern	132,582,499.23	637,903.82	0.48
Southern	18,520,786.52	118,250.46	0.64
Great Lakes....	69,582,078.10	249,905.89	0.36
Great Plains....	29,187,642.48	244,708.79	0.84
Western	31,070,480.52	90,253.21	0.29
Small	32,438,620.79	228,303.02	0.70
Middle	41,579,455.36	339,165.47	0.82
Large	206,925,410.70	773,553.68	0.37
All cities	\$280,943,486.85	\$1,341,022.17	\$0.48

A Complete Report on School Finance

This report is based upon the findings of a recent survey in which 375 principal cities of the country participated, and which was conducted by the American City Bureau for the National Committee of Chamber of Commerce Coöperation with the Public Schools. School officials and others interested in school finance in the United States can secure a copy of this report gratis from F. A. Richardson, Secretary, American City Bureau, Tribune Building, New York City.

Recent Installation of Centrifugal Pumps in Brockton Sewage Pumping Station

By E. F. Leger

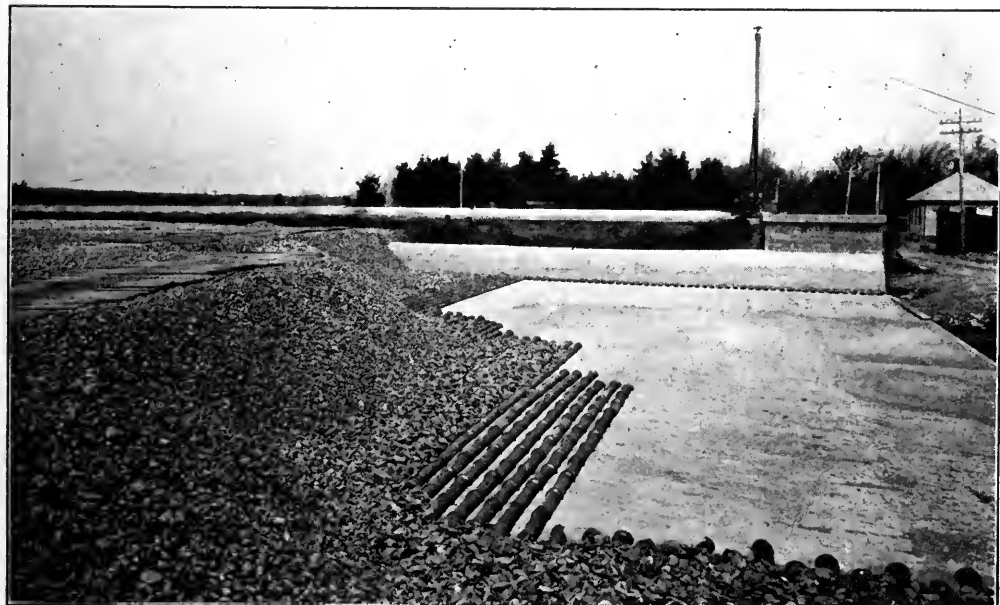
THE methods of handling, treating and disposing of municipal sewage are daily receiving more attention from engineers and municipal organizations. Each year it becomes more necessary to further restrict the use of streams as carriers of sewage, and each year witnesses improvements in existing methods or the exploitation of new methods for disposing of it. The problem of handling sewage efficiently looms large because of the constantly increasing amounts which the pumping stations are called upon to handle and the constantly increasing cost of fuel or power.

The city of Brockton, Mass., has recently made a radical change in the method of disposing of the city sewage in the transition from the original pumping equipment of triple-expansion, steam-driven reciprocating pumps to electrically-driven centrifugal pumps for pumping the city sewage. Located in a manufacturing district 15 miles from the coast, Brockton may be termed

an inland city as far its sewage problem is concerned.

The Original System

The city's first Board of Sewage Commissioners was appointed in 1892, and the State Board of Health approved the proposed plan of a system of sewers within the city limits to handle sewage only; this system to be of the combined type with underdrains for ground water, a pumping station and receiving reservoir to receive the night flow; and a system of downward filtration, the beds to cover approximately 23 acres. The City Engineer's report of 1893 covered the entire subject in a most detailed and excellent manner, and a system substantially as outlined by him was laid out and construction begun. The original plans and estimates contemplated a system of about 92 miles in length, and it is interesting to note that with the work performed in 1920 this length has just been attained. The original system served a popu-



NEW SECTION OF TRICKLING FILTER BEDS UNDER CONSTRUCTION AT BROCKTON
SHOWING THE GATE HOUSE

lation of about 30,000 persons, while to-day this has been increased to approximately 70,000. The pumping equipment which was installed by the Knowles Steam Pump Company consisted of two triple-expansion condensing engines rated at five million gallons each per day against 65 feet total head, steam ends being $8\frac{3}{4}$ and 15 and $26\frac{1}{2}$ by 24 and the water end 21 by 24 inches. These engines on test showed a duty of about 68 million foot-pounds per 100 pounds of coal.

The main sewer terminated in a gate-house with three connections—one into the reservoir, one into the creek by overflow, and one through the reservoir into the pump suction pit. The reservoir is 115 by 50 feet by 12 inches deep, completely covered, except for manholes, and has a capacity of about 500,000 gallons. The pump suction chamber is located at one end opposite the gate-house, and houses vertical screen bars spaced $\frac{3}{4}$ inches apart.

Until about 1896, the pumps ran only $2\frac{1}{2}$ hours per day, the pumpage averaging 550,000 gallons per day, but from chemical analysis it was estimated that of this 550,000 daily flow, about 400,000 was leakage due to infiltration. The trunk sewer is built of brick 32 by 48 inches at the pump-house, diminishing to 22 by 30 inches at the upper end, is egg-shaped in construction, and parallels a stream for about 20,000 feet, passing under it at several places. Although the level of this stream has been lowered by dredging and many leaks have been stopped in the brick work, infiltrated ground water is still a large proportion of the total pumpage. By 1900 the average daily pumpage amounted to 680,000 gallons per day, of which about 10 per cent was reported as sludge, and the sewage in that year showed 80 parts of solids per 100,000 parts of evaporation, and about 8.3 parts per 100,000 of chlorine.

During 1900 each filter-bed received about 20 doses before being raked off, and about 1,200 tons of sludge was removed during that year. The beds performed their work most efficiently, as was shown by the constant analysis of effluent. The records of the pumping station in 1900 showed a duty of 32.4 million foot-pounds per 100 pounds of coal. This was figured on plunger displacement without making any correction for slip, but it did include the coal which was used for heating the building.

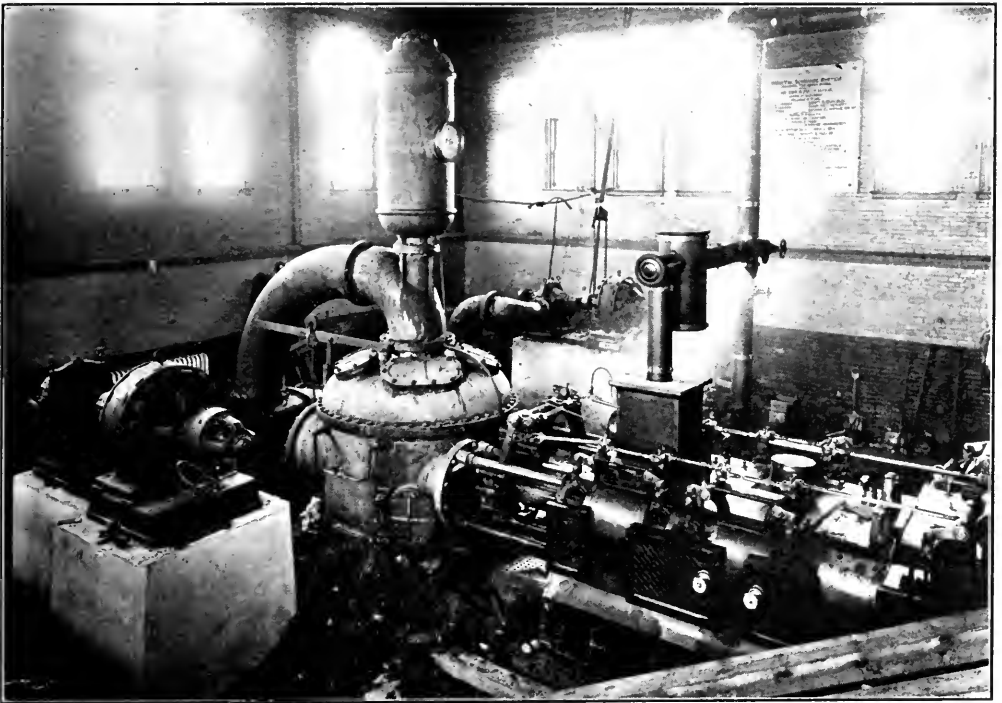
This was such a tremendous drop from the 68 million foot-pounds which the test showed only a few years earlier, that it is worth while to attempt to determine what approximate amount of coal could be charged off for the heating. The station records show that for the months of October to March, inclusive, an average of 1,400 pounds of coal a day was used, while from April to September, inclusive, about 1,300 pounds of coal was used per day as an average, so that for the six winter months the average was only 100 pounds a day more than for the summer months. This is not wholly conclusive, however, for in February 1,712 pounds of coal was burned as a daily average, with a duty of 37.1 million foot-pounds, while in June 1,725 pounds was burned, with a duty of 33.8 million. It is true that about 10 per cent more water was pumped in February, but the duty shown in February is just about 10 per cent greater than the duty shown in June, so that the records would serve to indicate that very little coal was being used for heating and that the pumps were evidently failing very rapidly, and pumping station costs were running so much greater than was presumably necessary that efforts were immediately begun toward changes which would effect a reduction in the costs.

The Work of the Filter-Beds

In 1906 the duty had been raised to 34.2 million and in 1907 to 38.6, but it was becoming more and more apparent that in addition to the low efficiency shown by the pumps, the filter-beds were approaching their limit of capacity for the increasing population. In 1906, almost fifteen times as much work was done by the beds as in the first year of their installation; that is to say, the albuminoid factor obtained by multiplying albuminoid ammonia by the 100 million gallons was 12.28 as against .81 in 1896, and the amount of sewage which was treated had increased from 183 million gallons to 450 million gallons in 1906. The clogging of some of the filter-beds in 1909 made it imperative that additional areas be acquired or that some change in the system of disposal be considered. At this time the question of trickling filters was investigated, as well as the possibility of an auxiliary to the pumping station in the nature of finer screening at that point. In

1911, as a result of investigations along these lines, a Weand rotary screen having 120 mesh to the inch and about 8 feet in diameter, together with a De Laverne oil-engine-driven centrifugal pump, was installed in addition to the screen-house. Raw sewage from the intercepting sewers was then pumped through the inclined revolving screen, the sludge being moved by an internal screw toward one end where it was hydraulically pressed free of most of the liquid and was finally burned under the

screen gave satisfactory results, its cost of operation, and especially its maintenance charges in order to keep it in good repair, became so great that other methods of meeting the filtering conditions were considered. After several months of experimenting, the sprinkling filter was installed. The filter-bed proper covered one-half an acre and consisted of broken stone to a depth of $6\frac{1}{2}$ feet. The sewage was distributed over this bed through risers connected to the distributing main. Taylor spray nozzles were



THE BROCKTON, MASS., SEWAGE PUMPING STATION SHOWING TWO ELECTRIC PUMPS IN PLACE AND ONE STEAM PUMP STILL IN OPERATION

boilers. The screened sewage was returned to the pump-pit, from which it was pumped to the beds. This, of course, was of great assistance to the beds, in so far as the question of sludge was concerned, and practically eliminated the troublesome question of sludge removal at the beds.

The advent of new manufacturing plants in Brockton, however, particularly for utilizing leather wastes, increased the duty on the sewage station because of the nature of the refuse that was turned into the sewers, and although the Weand rotary

used, spaced about 8 feet on centers, and the variation in spray area was controlled by a special motor-operated butterfly valve in the main distributing line. A maximum pressure head of 16 feet was obtained by a constant level tank. The filtered sewage flows into a detention basin, where it is allowed to settle for about six hours, and from there it is passed on to the oldest sand-beds.

New Pumps Needed

The operation of a sprinkling filter demanded that the pumping be continuous.

and the flow had by this time assumed such proportion that it was really necessary to keep the pumps moving in order to prevent the reservoir from overflowing. The daily average pumpage in 1914 was over 2,000,000 gallons, and the duty on 100 pounds coal basis had dropped to 23.27 million foot-pounds after deduction for ashes (about 8.8 per cent) and including correction for the slip of the pumps, which had been determined by weir measurements. The sprinkling filters worked so satisfactorily that efforts were next directed toward improving the methods of pumping. The pumps had by this time become dangerous to operate, and the rising cost of coal, together with the poor grades obtainable, had great bearing on the report of the engineers who made recommendations for the installation of centrifugal pumps. The oil engine was considered for driving the pumps, but the lower first cost, lower maintenance costs, and greater simplicity of electric motor drive more than offset the apparently lower actual fuel or operation costs of the oil engine.

The contract was awarded for installing complete two 3½-million-gallon, and one 2-million-gallon motor driven De Laval centrifugal pumps. The flow in 1918 was over 2¼ million gallons per day. The Weand screen was costing about \$12,000 a year to operate and keep in repair, and it was finally shut down, allowing the sewage to pass through the ¾-inch iron screen-bars directly to the pump suction. The reservoir was cleaned for the first time since the screen had been put into operation. In 1918 the installation of the centrifugal pumping units began, and the contract required that the station be kept in operation while the change was being made. This made it necessary to remove one steam pump before connections could be made to operate the first motor-driven unit, so that from November, 1918, when the reservoir was cleaned, to April, 1919, when the first motor-driven unit was put into service, it was impossible to keep the level of the reservoir much below the overflow point.

When one motor-driven unit was installed, it carried the load during the time of taking out the second steam pump and installing an additional motor unit, so that it was about October, or almost a year, before everything was ready for the test on the electrical installation. During the year the

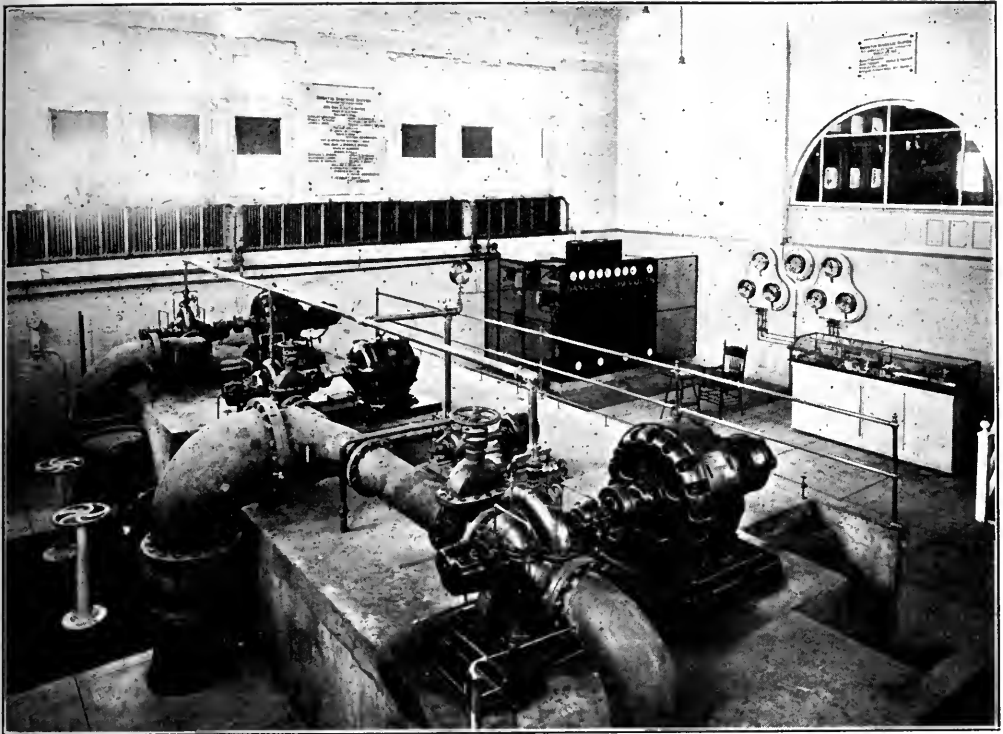
reservoir had been serving as a settling basin, not from choice but from necessity, since at no time during the year was it possible to operate more than one pump at a time, and as a result, the flow of sewage through it had been very slow. When the motor-driven units were put into operation to lower the level to the contract condition for test, it was not long before the result of this settling manifested itself. At elevation 71 (the overflow being at 76) the pumps lost their water, and on investigation it was found that the reservoir was half full of settled sludge, so heavy for a depth of from 6 to 7 feet that it would not flow, and at the manholes, where ladders were let in, the mass of rags, grease balls, and solid refuse was sufficient to support the weight of a man.

Removing the Sludge

Three fire streams were brought to play through the manholes in order to break the sludge, but the streams simply bored holes without supplying sufficient volume to keep the pump supplied. Finally the discharge of the pumps was so regulated, as well as the inlet valve to the reservoir, that the mass was kept sufficiently loose to move, but the agitation on the screen necessitated by the constant raking permitted such large rags and waste to pass through in such a concentrated volume that the pump impellers became clogged and lost their suction on the high lifts.

The condition was so bad, the material so heavy and the progress so slow that it was proposed to break into the top of the reservoir and use a steam shovel to remove the sediment. This would have entailed so great an expense, however, that it was decided to make special efforts toward the design of a different type of impeller for sludge removal.

An open-type double-suction impeller with removable side-plates was designed and installed in one of the pumps, and from the very first it became evident that it would do the work required. Aside from the breakage of one impeller, due to a defect, which occasioned slight delay, the reservoir was finally cleaned thoroughly by throttling the discharge of the pump and working the sludge ahead by fire streams. The reservoir was swept clean, and levels and dimensions were taken to act as a check on the Venturi meter. The preliminary readings



THE COMPLETELY ELECTRIFIED SEWAGE PUMPING STATION AT BROCKTON, MASS.

which were taken on the efficiency of the open-type impeller, when pumping near capacity, compared so favorably with the highly efficient closed type of impeller that all the pumps were equipped with these new open-type impellers, and they have all handled the sludge whenever called on to clean the reservoir, which is now done each month.

The electrified station consists of two 10-inch De Laval centrifugal pumps directly connected to 80-h.p. synchronous motors, 3-phase, 50-cycle, 2,200-volt, with directly connected exciters and one 8-inch De Laval centrifugal pump directly connected to a 40-h.p. squirrel cage induction motor. The larger units operate at 1,200 revolutions per minute, and the smaller unit at 1,750. The motors are controlled by a four-panel switchboard, one panel for each motor and one for the incoming line, with all necessary instruments for reading voltage, amperage, kilowatts, and the necessary switching equipment. The pumps are set at elevation 83 and are primed by means of a Nash turbo-vacuum pump directly connected to a 2-h.p. motor. The piping is so

valved that any one pump or a combination may be operated, permitting the pumping of from 1,000,000 to about 7,000,000 gallons per day. The pump shafts are provided with stationary protecting sleeves to prevent rags, strings, etc., from wrapping around the shafts, in addition to being thoroughly bronze-covered, and the knife-like sides of the blades when operating against the cone-shaped surface of the side plates tend to shear or cut any ordinary rags, waste, etc., which would plug a closed-type impeller.

The three units are placed in the station in about one-quarter the space which was formerly occupied by the two steam pumps, and the old boiler-house has been renovated into a garage.

Reduced Operating Cost

The cost of operating the electrically driven units is approximately \$10 per million gallons of sewage pumped less than the cost of operating the old steam plant. The present pumps show an efficiency of about 66 per cent over-all (wire to water) on the large units, and 64 per cent over-all on the 2,000,000-gallon size. The \$10 per mil-

lion gallons represents a reduction of almost 30 per cent, since the steam plant cost approximately \$30 per million gallons to pump, which has been reduced to \$20 per million at the present time. The labor cost was reduced, not by the wholesale laying off of men, but rather by a change from the same number of firemen and engineers at about \$28 per week to an equal number of operators at \$21. The station help consists of a chief engineer and four operators, with two laborers raking the screens.

The pumps have operated very satisfactorily with practically no trouble from clogging, even under the most adverse conditions. They are built with horizontally split cases, and the covers can be removed and inspection made and the pumps placed in service in about twenty minutes, whereas the number of valves and inaccessible places on the old steam pumps necessitated at least eight hours to clean. Along with the change in the pumping station, improvements have been made at the filter-beds. The one-half acre of sprinkler filters originally installed worked so satisfactorily that an additional area of two acres was constructed. Three detention tanks of 200,000 gallons capacity each have been built, and the syphon chamber has been so designed that the period of making and breaking the syphon will produce the variation in spray area desired, instead of using the motor-driven butterfly

valve. The settled sludge in the detention tanks is flushed out onto old beds, and the work of the sprinkling filter is thereby much reduced. The receiving reservoir is not being used, since the intercepting sewer discharges directly into the screen chamber; the pumps are pumping raw and unsettled sewage at all times.

The recording meters give the operators levels in the suction wells, rate of discharge through the Venturi meter, pressure in the force main, and the periodic readings of volts, ampere and kilowatt meters give accurate data for checking the duty of the units at any hour. The sewage flow has increased constantly, the billion-gallon mark having been passed in 1919 for the first time, and the first week in May, 1921, showed an average daily pumpage of 5.4 million gallons per day.

The outstanding features of interest are: First, the very excellent system of sewage disposal which served so well for twenty-five years; second, the very satisfactory transition from the downward filtration sand-beds to the detention tanks and sprinkling filters for increased capacity, and third, the interesting fact that it is not necessary to use inefficient centrifugal pumps for handling sewage merely because they are simple, and easy to keep clean, but that centrifugal pumps have been designed to handle raw sewage efficiently.

The School Nurse—Her Duties and Methods

By Percy Powers, R. N.
Winston-Salem, N. C.

SCHOOL nursing is the natural outgrowth of medical inspection of children, which resulted in the exclusion from school of many children with minor contagious diseases. Very soon it became apparent that medical inspection must be carried further than the detection and exclusion of children suffering from contagious diseases or physical defects. School authorities and physicians began to cast about for a solution of the problem, and, following the habit so well established in

the home and in the care of private patients, the nurse became a necessary and successful complement to the school physician.

Medical inspection sends the child home with a notice and "Call your family physician." In most cases a family physician is not called in, because, to use the words of Artemus Ward, "There ain't none." The child is kept out indefinitely without effective treatment, to mingle on the streets with other children after school hours and beyond the control of school

authorities, a condition placing a costly tax on class work and attendance, and offering a premium on truancy.

To do for the child without professional aid what medical inspection directed and suggested was an utter impossibility, not only in the home of poverty, superstition and ignorance, but as frequently in the home of the better class, carelessly busy or unconsciously indifferent. This led to the employment of a corps of nurses to carry out and supplement the work done inside the schools.

Classroom Inspection of Children

The duties and functions of the school nurse are many. She assists in the prevention of contagion and in the correction of physical defects, and is responsible for the education of children, and oftentimes their parents, in the principles of personal and public hygiene.

In making preliminary inspections the nurse visits each classroom. Before inspection begins, short simple directions should be given so that each pupil will know what is expected of him. The nurse then stands with her back to a window and has the children in the room file past her, each child holding out his hands with palm and wrist exposed. He then opens his mouth wide and is instructed to say "Ah! Ah!" which gives a fair view of throat and teeth; then with the fingers of one hand he pulls down his eyelids in such a way as to expose the conjunctiva. In this manner the eyes, throat, teeth, skin and hair of each pupil are examined and the general condition as regards cleanliness and nutrition is noted. The pupils demanding immediate attention may thus be easily selected.

It cannot be too often repeated that the examination of pupils for contagious diseases is a relatively unimportant part of health supervision of schools. Statistics show that as a rule not more than 4 per cent of the pupils of a school system need to be excluded in one year, whereas on the other hand 60 per cent of the pupils suffer from non-contagious defects which need correction. Notwithstanding this relative importance shown by figures, carelessness in this direction may easily bring into confusion the whole school organization, to say nothing of numerous homes. With the advent of scarlet fever, diphtheria, meningitis, or the more frequent cases of measles,

whooping-cough, etc., a constant and careful watching of the pupils will avoid an epidemic. Children with scabies, impetigo and pediculosis are excluded, but if treated by the nurse at the school or by the parents after her instructions, exclusions are usually reduced to 10 or even 5 per cent of the number previously necessary.

Carrying the Work to the Home

The postal card notification is a poor educational device. Parents notified of physical defects are advised to have corrections made. If at the end of a reasonable time the child is not placed under treatment, the nurse goes into the home and by tactful presentation of the child's case effects what practically no other agency can accomplish. It may require frequent and repeated visits and much moral suasion to induce parents to take the proper steps toward medical care. Many parents do not see the necessity of correcting defects that to them seem minor but which the nurse knows may be a handicap to the child through life. In such cases the nurse must be kind and sympathetic, having due respect for the superstitions and traditions of others, but at all times the nurse must be friendly, shaping these whims into stepping-stones toward her desired goal—the proper care of the child.

We often hear how well a nurse controls or manages her patients, how easily she seems to bring them to her plans. This is based almost entirely upon her ability to understand the parents' point of view. The school nurse must understand the child's point of view, and the parents' point of view, and then from this angle only may she hope to bring them to an understanding of her vision for the child. A common point of view must be reached, else failure in the particular case at hand is liable, and, worse still, any hope for future coöperation in the family is given a severe blow. The financial situation is often the real reason for failure to secure proper care for children even when specific defects and their results are pointed out to intelligent parents, but this obstacle may be removed by the nurse without any offense to family pride if she is wise in her treatment of the subject. The fears of parents must be allayed, and at the same time they must be brought to realize how important it is for the child to be given an equal chance with the well

child to develop into a leader of his grade, and eventually into a good citizen. If a mother be unable to take a child for treatment, either because she is a wage-earner, or because of home duties, or if, as is often the case, she is timid about approaching a specialist or about making hospital arrangements, the nurse accompanies the child.

One might continue indefinitely a list of such duties and occasions in which a school nurse may be the means of righting defects, and yet there would be in the mind of the reader other instances and ideas which would apply to his own particular school and community.

In every contact with her people—for soon they become her people—the nurse should be able to keep in mind the future of her work. The righting of individual defects through constantly appealing is only a part of the great principle of school nursing. The greater outlook, that which has given to this branch of nursing, service and individuality, is teaching.

The nurse who visits a home to advise medical care for a child is falling short of her highest possibilities if she confines her attention entirely to that child. Often there is a baby in the home, and every mother is made happy by some little attention shown to this most important member of the family. The nurse, without seeming inquisitive, can learn about the baby's health, its food, how it is dressed, and if these conditions are not favorable to the child's development the mother may be given various suggestions or may be directed to the Infant Welfare Station or whatever organization the city or county affords for better and healthier babies. Thus the mother is taught, to a varying degree of success. But in the schools is the greatest opportunity for the nurse. This is her realm. Teach these children, not alone to relieve the day's needs, but so that they may be permeated with sane principles of personal and community hygiene.

The nurse should attend the emergency case, dress minor wounds, burns, etc., so

that the child may learn anew the old adage, "An ounce of prevention is worth a pound of cure." But above all she should teach the child that physical and mental development follow definite principles of intelligent thinking and living.

In case the school is not large enough for a nutrition expert this may come into the work of the school nurse, and nowhere can there be found a more interesting or a more needed line of study than this. Make schedules of weight, urge right and nutritious diet. It is easy to get the child interested in being a normal child. Teach him that he can think more quickly, accomplish more, play better ball, be a better man, provided he will feed himself intelligently. The recent "Drink More Milk" campaigns are so well known in methods and results that I need not urge that this is the simplest and most accessible form of nourishment. These experiments show that children if brought to think in terms of need and nutrition will deny appetite more readily than adults.

In order that the nurse may succeed, she must early learn that coöperation must be her keynote in all successful public health work. The coöperation of medical inspector, principal, teacher, parents and nurses more than doubles the efficiency of health work. To be sure of this the nurse must be patient, must possess a broad mental view, must be slow to take offense. Much of her success or failure will depend on her ability to fit her work into the daily program of the schools, without disturbance or interruption of classes. There is probably no other branch of nursing in which personality counts for so much as in this work. She should possess good sound sense and judgment, quick perception, a faculty for keen observation and quick decision, good memory, cheerful disposition, and imagination and vision which will enable her to see the results of her work in future generations.

ACKNOWLEDGMENT.—From a paper read at the North Carolina Health Officers' meeting, Pinchurst, N. C., April 25, 1921.

Buying Health

Community health is now almost reduced to an exact science. The "art of medicine" is rapidly disappearing and in its place is coming exact and scientific medicine. Today you can buy your protection against disease as you do your coal or your flour. This is literally true with many diseases. If

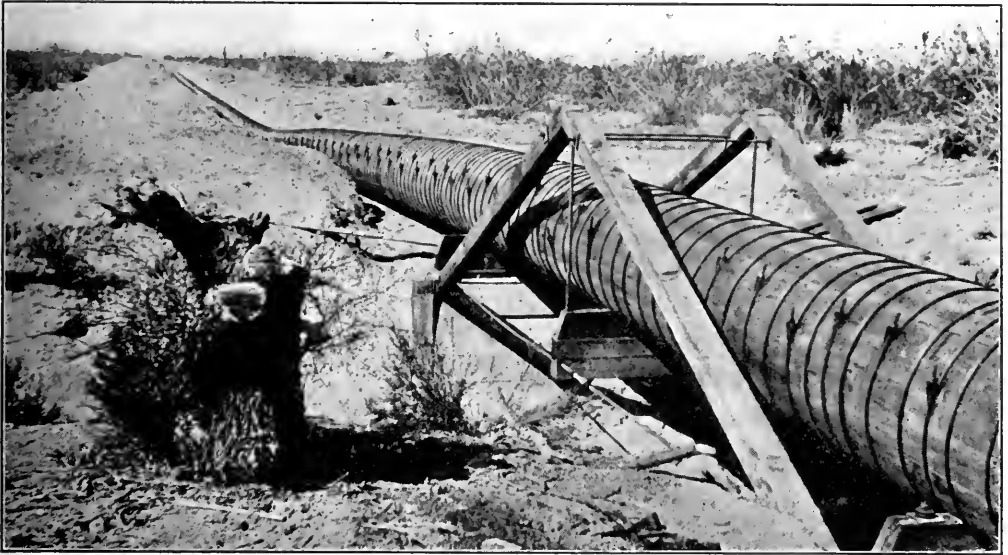
you are afraid of diphtheria because it is prevalent in your community, you can have your blood tested and know whether you will contract the disease if exposed. Then if you are found to be susceptible, you can be treated so that you will not have diphtheria. Surely this is buying health.

The New Water-Supply of Phoenix, Ariz.

Interesting Construction and Use of Wood Pipe in 30-Mile Supply Line

IN the October, 1919, issue of *THE AMERICAN CITY* was described the prospective new water-supply in Phoenix, Ariz., which was to follow the construction of 32 miles of conduit to bring the soft, potable water of the Verde River to the city, thus instituting a gravity supply in place of pumping hard water from wells, as had been done for many years. This work has now practically reached completion.

The maximum head on the pipe line is 160 feet at the city terminal. The wood pipe construction was handled under two contracts, all trenching and backfilling being done by the city. The first 14½ miles, beginning at the city main, was laid by the Redwood Manufacturers Company, and the remaining 14½ miles by the Pacific Tank and Pipe Company, both of San Francisco, Calif. California redwood was specified for



THE WOODSTAVE PIPE LINE CROSSING THE OLD EVERGREEN DITCH

The Supply Line

The supply line, extending from the distribution mains at Phoenix to the Verde River, consists of 32 miles of redwood continuous stave pipe. That part extending six miles from the city to the reservoir site is 38-inch pipe, and from the latter point to the Verde River intake the pipe line is of a uniform diameter of 36 inches. The Verde River end is a settling basin of concrete 20 feet square for the removal of sand. The settling basin is close to the river bank and has a spillway where the water may be diverted to the river when desired. On the same side is a gate through which accumulated sand may be sluiced out of the chamber into the river.

the entire line.

From the city limits to the Granite Reef dam, 24 miles from the city, the pipe line passes over a smooth surface of bench and valley line, crossing arroyos, underpassing highways, spanning irrigation canals by inverted siphons and bridges. A large part of the line along the Verde River is through country requiring cuts and sharp curves. The maximum curve in that locality is on a 175-foot radius.

Lower Section of Pipe Line

The first 14½ miles, built by the Redwood Manufacturers Company, consists of 6 miles of 38-inch pipe and 8½ miles of 36-inch pipe. At the city end the pipe is con-



THE LINE ALONG THE VERDE RIVER SHOWING CONSTRUCTION METHODS

nected with the city mains by means of a cast iron T, imbedded in concrete, the lower section of the pipe being banded to sustain a pressure of 59 pounds per square inch under the maximum head of 160 feet. The 6-mile section, extending from the city limits to the reservoir site, rises 140 feet. At the latter point the 38-inch section is connected to the 36-inch section by a cast iron T and valve, the joints being grouted with a mixture of oakum and neat cement, finished with lead wool. The T section for the reservoir supply will connect with a wood pipe, running at right angles to the main line. The reservoir is to be constructed later and will hold about 7 days' supply. The 38-inch pipe section was laid in a trench covered with a 6-inch layer of dry dirt, and then puddled and backfilled. A large section of the $14\frac{1}{2}$ -mile section is straight; about 2,000 feet of the 36-inch pipe is on the hydraulic gradient and it was necessary to lay part of the line in a 10-foot trench in order not to exceed that level. At one point the line crosses the drainage canal by an inverted siphon, making a vertical curve of 188-foot radius.

Upper Section of Pipe Line

The upper $15\frac{1}{2}$ -mile section of the wood pipe line built by the Pacific Tank and Pipe

Company was of much more difficult construction, as it involved considerable variation in pressure and numerous short-radius curves. From the point where the upper section joins the lower, the line extends toward the east over the bench line, crossing an arroyo on masonry piers, then passing over a stream on a Howe truss bridge and dropping 50 feet to the level of the Salt River Valley. A 50-foot steel stand-pipe is placed in the line where it dips to the floor of the valley. The stand-pipe, which is on the up-stream side of the gate valve, reaches to the hydraulic gradient and serves to relieve the pressure when the valve is closed. At one of the canal crossings the line makes a reverse curve. In order to preserve the newly made pipe line, it was kept filled with water by a pump stationed at this crossing.

In the construction of the entire line, red-wood staves ranging in length from 8 to 20 feet were used. They were of a standard thickness of $1\frac{9}{16}$ inches and a width of $5\frac{5}{8}$ inches. The $\frac{1}{2}$ -inch steel bands are fastened in malleable steel shoes. The band spacings vary according to the pressure on different sections of the line, ranging from $\frac{1}{2}$ -inch for the maximum 160-foot head to $5\frac{3}{16}$ inches for the 80-foot head and $9\frac{7}{16}$ inches for the 40-foot head.

Coal Storage as an Aid in Coal Buying

By Homer V. Knouse

Assistant Superintendent, Metropolitan Utilities District, Omaha, Nebr.

THE coal bill of a public utility is such a large percentage of the total operating cost, and the amount of coal consumed per unit of the delivered commodity is so true an index of the physical condition of the property, that in capably handled plants a great deal of attention has been given to both the delivered price of the fuel and the efficiency of the various power units

In general, the buying of coal has been by one of two methods: by contract, wherein the seller agreed to furnish the output of a certain mine, or from a certain district; or by the purchase in the open market of such coal as is needed to keep the plant in operation. The first plan has many advantages, inasmuch as the seller is interested in seeing that the coal arrives at such times and in



A GENERAL VIEW OF THE COAL STORAGE PITS OF THE OMAHA, NEB., WATERWORKS
No. 1 pit is shown in the background and No. 2 pit in the foreground. The locomotive crane is seen next to the boiler house and the hopper is plainly visible on the roof

which make available the energy stored in the coal.

In buying coal, consideration is given to the steaming qualities of the various classes offered and a comparison made of the delivered price, tests are often made to determine the test B.T.U.'s of the product as delivered, and in many cases the price to be paid has been determined upon this basis. In using coal there have been innumerable devices offered which would increase the ability of the boilers to convert the stored energy into heat, and careful design with care in operation has effected wonderful economies in power plant operation.

such quantities as the plant finds desirable, and the purchaser can usually depend upon a steady supply of approximately uniform fuel. The second plan has more of an element of risk, since the price will probably fluctuate considerably, and the available supply and quality may be subject to great variation.

Variations of the above plans were tried by the Metropolitan Water District of the city of Omaha, but due to the difficulties that were encountered under each, a study was made to evolve a plan which would obviate a part or all of them. It had been noted that at certain times of the year there

would be large offerings of the finer grades of coal at prices that were very attractive, and that the price per ton at the mine would bear no relation to the quality of the coal being offered. A plan by which the purchases could be made during these periods, and the coal stored until required for use, appeared to offer the maximum advantages in economy, and to also insure an ample reserve for operating peaks and temporary failures of supply. It was known, however, that it would be impossible to store any considerable quantity of the fuel in the ordinary manner due to heating in the piles, and very great consequential loss in heat value. The solution was obvious, and it only remained to provide a storage of such type that heating could not take place, and of such capacity that sufficient coal might be stored to carry over the periods of scarcity and resultant high prices.

In 1913 the D-strict constructed the first pit for the storage of coal under water. It was located parallel to the boiler room and at a sufficient distance away as to provide space for two railroad tracks for the handling of loaded and empty cars. Constructed of concrete, entirely below the ground level, it had a capacity of fully submerged coal of 2,500 tons, and when piled about 3,500 tons could be stored. It was anticipated that due to capillarity this amount of surcharge could be kept sufficiently damp to prevent heating, but this has not been entirely successful, and small areas considerably above the water line have at times fired, making necessary the use of hose lines to cool the coal piled high.

In 1918 a second pit, having a submerged capacity of 6,000 tons, was added, only slight changes in design being made to conform to the experience with the first pit. With the two pits in use it is possible to store a sufficient amount of coal to carry the plant about five months, and since there is a small tonnage moving to the station at all times it is possible to make practically all purchases during the semi-annual periods of low prices.

The coal is handled from cars to pit by a 25-ton steam locomotive crane equipped with

clam-shell buckets, and the same machine takes coal from the pit for filling the hoppers built into the roof, from which the supply is distributed to the boilers by a larry in the boiler room. The same crane also removes the cinders from a pit located at the end of a tunnel passing under the boiler room floor in front of the ash dumps.

Low prices of coal are due in general to two factors. The most important is that there is an excess of screenings at such times of the year as there is a large movement of screened or prepared sizes and with no appreciable market for the finer grades at steam plants having small storage capacity. This occurs in the spring and fall, and it is often possible to obtain very low prices on grades that are highly desirable, and in such quantities as are determined only by the unloading capacity of the receiving plant. The second element is the so-called spot coal. Companies having contracts with the steam users for their requirements must have moving at all times sufficient coal to supply the wants of their customers, and oftentimes sudden warm weather will cause a considerable tonnage to be in transit or actually arrived at destination for which there is no storage available, and for which there is no sale among those who are generally in the market. Brokers may have many cars due to the same causes, and a resulting weak market forces the spot coal to a price which makes the price attractive to the plant that has made the necessary investment to enable it to take advantage of such conditions. And the coal dealer or broker is not at all averse to having a dump, for he may be reasonably sure of disposing of surplus tonnage, even though he must take a loss that would only be greater had he not had such an outlet.

While an accurate check has not been possible with this plan of coal buying, the management feels sure that in the case of each pit the entire cost of construction was wiped out during the first year of operation, and this in addition to the feeling of security that came from having at all times an ample reserve of the plant's most essential supply.

How to Establish Successful Rural Truck Routes

By R. E. Chamberlain

CHAMBERS of commerce and city bodies everywhere have come within the last two or three years to a realization of the advantages that may be drawn from the development of closer communication between the cities and towns, which has been made possible by the motor truck. All over the country there are large and fertile stretches of territory which have been retarded in development by lack of adequate transportation to market their products. Their backwardness has been due in no way to the fault of the people living in that territory, who are only awaiting proper guidance and will respond to it by rapid and solid growth. In many cases, perhaps in most, this guidance can come only from the civic bodies in the cities to which this undeveloped territory is, or should be, tributary.

The increased prosperity of the communities that will result from such leadership if intelligently given is of almost equal benefit to the communities themselves and to the cities upon which they depend for marketing. In many cases, where the trade from such territories is now divided between a number of cities, any one of these cities could acquire practically the whole of it by taking the lead and installing facilities which would make it the most convenient and logical depot.

Study Needed for Success

Unfortunately, attempts to put this knowledge into practice and to establish rural truck routes feeding into and out of cities have not always been successful, so that many civic bodies have come to look with distrust upon projects of this kind in spite of the obvious opportunities they offer. Such a truck route must be not only self-supporting but profitable if it is to continue in operation, since no civic body will care to assume an annual deficit for the support of a transportation line.

The errors that have caused previous failures should be carefully studied and new projects entered upon only with the fullest

knowledge. In this way it will usually be found possible to establish such transportation routes from the very first upon a paying basis, and if, after careful investigation, no fundamentally sound system can be worked out, the danger of failure will at least have been avoided.

A successful plan can be worked out only if the organizers have definite information in regard to three things: first, road conditions in the territory to be served; second, the amount of freight to be handled, both incoming and outgoing, the direction in which it normally flows, and the present cost of transportation; and third, the cost of motor transportation over these roads.

It is perhaps in regard to this latter cost that the largest number of errors are made, because of the tendency of enthusiasts to overlook sinking funds, interest and various other items which absolutely must be considered if a net profit is to be turned out for any considerable period.

The Fulton County, Pa., Survey

An example of the method by which these dangers can be met is a recent survey of Fulton County, Pa. This survey, which was made by Frederick B. Weed and John J. McCarthy of the Packard Motor Car Company, resulted in the working out of definite truck freight routes and laid down a definite budget. The results of the work have been fully justified by experience.

Fulton County lies along the southern boundary of Pennsylvania. The county-seat, McConnellsburg, is 163 miles west of Philadelphia. The county averages 30 miles from north to south, and 12 miles from east to west, with a total area of 402 square miles. It is situated in the heart of the Allegheny Mountains and is completely hedged in, the valley bottoms being extremely fertile farm land. The population in 1910 was 9,703, and the county has shown a steady decrease in each census since 1880, due to the fact that young people have been working outside.

This county has no railway facilities

whatever, although important railroads approach it closely on all four sides. It is, however, crossed by the Lincoln Highway from east to west and has also an excellent north-and-south road. It is walled in by high mountains. If the farmers could reach the railroads they could sell their products in New York, Philadelphia and Washington, or could reach Pittsburgh and the western markets. At the time the survey was made they were selling a very limited amount of products because of poor transportation facilities, and they had to accept lower prices in the near-by markets,

tion of the county, the number of inhabitants and the distribution with reference to the roads, the total value and total bulk of products produced, and the means of transportation already in existence or at all likely to be constructed. It also covered the wealth of the people and their buying habits. Finally, information was obtained to show what competition there might be from other truck companies in case the transportation line were established.

Freight Movement

The most important part of the survey



TYPE OF PACKARD TRUCK USED IN THE FULTON COUNTY, PA., RURAL EXPRESS ROUTES

limiting their products to the demand for them in the open markets.

The problem was to supply these people with transportation that would serve their purposes and help develop the country. It was obvious that the solution of this problem would at the same time add greatly to the prosperity of the towns through which their products were shipped and their purchases made.

Two weeks were spent in making the survey of the county. Information was gathered from every possible source, and the work in the field took the form of questioning the farmers, storekeepers, railroad agents, bankers and others who might have data or be interested in the organization of a motor truck transportation company.

This investigation covered first the loca-

had to do with the movement of freight. A large map was constructed, and inserted in it were tacks of two colors, one to indicate inbound and the other outbound freight in quantities of 100, 250, 500 and 1,000 pounds per week. This work was so carefully done that tacks were inserted for almost every farm that might possibly be tributary to the truck transportation system. Great care was also taken to ascertain the cost of hauling products to market by the present systems.

With the data at hand, the transportation engineers proceeded to work out routes for handling the freight that might be offered. Care was taken to base these plans upon actual present conditions, although it was realized that the development of a good transportation system would stimulate pro-

duction and add greatly to the amount of freight available for transportation. But it was felt that the rural express route must maintain itself profitably from the first, and that the expected development would not occur until farmers had become convinced that the new institution would be permanent.

In this particular case it was decided that all truck routes laid-out (four were proposed) should pass through McConnellsburg, the county-seat. At this point it was found there was a considerable amount of freight, both inbound and outbound, and the plan is to have the trucks which passed through complete full loads before starting over the mountains to the nearest railroad stations.

The data which had been collected made it possible to figure quite exactly what freight would be available for outbound traffic on the basis of pounds per week, and to make a very close approximation of the amount of incoming freight. The method by which this was accomplished can best be shown by a quotation from the report with regard to the haulage on route number 1. On this point the report says:

"Located directly on the route from Hancock north to the boundary line of the Southern Section there are 66,000 pounds to be hauled each week, besides all the hauling which could be got from farmers located some distance from the route. This makes 11,000 pounds per day to be hauled south along this route, of which approximately

4,440 pounds would be wheat
770 pounds would be rye
1,320 pounds would be buckwheat
990 pounds potatoes
550 pounds milk
110 pounds butter
440 pounds eggs
1,320 pounds apples and other fruit
550 pounds live stock

Naturally, this hauling would not remain constant, but is based on the yearly average of forty weeks' hauling, as are all the averages on the map and in this report.

"In regard to the incoming freight, there will be at least 32,000 pounds, as shown on the map. This consists of general merchandise for the storekeepers and fertilizers for the farmers. Thus there would be a little over 5,000 pounds per day to be hauled into this section from Hancock.

"Taking in the Eastern Distribution Section from the blue line north to Harrisonville and east to Fort Loudon, the haulage would be approximately as follows: 19,500 pounds per week, or 3,250 pounds per day. This is not taking into consideration any haulage of material to be picked up at McConnellsburg and carried east to Fort Loudon.

"There would be a proportionate amount of

hauling back over the mountain from Fort Loudon. As to the haulage from McConnellsburg east to Fort Loudon, that will be taken up later, where we shall show very clearly that there is enough haulage to keep all of our trucks full that may pass through McConnellsburg to Fort Loudon through the whole working time of the trucks.

"The Southern Section of this route will be taken care of absolutely. From the blue line north and east there will be a good daily average of hauling, and at McConnellsburg the trucks will load up for the trip over the mountain to Fort Loudon."

Similar analyses were made on each of the other three routes recommended, and it was shown that the freight from the county-seat would be more than enough to provide full loads for each truck passing through.

The second step in preparing the system was a careful estimate of costs. There was first determined the administrative overhead for the entire system, and then the cost of the fixed charges on investment, etc., for each truck.

"The cost of operating four 2-ton trucks daily on foregoing four routes will be approximately as follows. We are estimating 240 days' operation per year, which we believe is a very conservative estimate.

(a) ADMINISTRATIVE OVERHEAD FOR ROUTE

	Per Month	Per Year
Manager's salary	\$150.00	
Rent for office and shipping-room at McConnellsburg	25.00	
Stationery.....	6.00	
Miscellaneous	19.00	
Total overhead for route.....	\$200.00	
Overhead charges against each truck	\$ 50.00	\$600.00

(b) FIXED CHARGES OF TRUCK OPERATION FOR EACH ROUTE

Approximate Cost of Operation 2-E Truck—240 Days per Year

Total investment—	
Total investment	\$4,649.28
Tire cost, including tubes	629.80
Depreciation amount	\$4,019.48

	Per Year	Per Day
Administrative overhead	\$600.00	\$2.50
Interest at 6 per cent based on \$4,649.28 average yearly interest during life of truck, approximately 5 years	166.65	.69
Insurance (including fire, theft, liability and property damage)...	309.50	1.29
License 1920 law.....	30.00	.13
Garage	120.00	.50
Driver, actual salary, monthly basis \$100 per month.....	1,200.00	5.00
Total fixed charges per day..		\$9.11

The charge of operation on each of the four routes would necessarily differ according to the mileage run, and these variable charges were estimated. The method of

this estimate is shown as follows in the case of route one:

Hancock to Fort Loudon—81 miles per day. Operating expenses:

	Per Mile	Per Day
Gasoline—6 miles per gal., at 27c.	.045	\$3.645
Lubricants		
Cylinder oil at 60c. per gal.		
240 miles per gal., .00250		
Other lubricants, grease, etc., .00255	.00505	.40905
Repairs (sinking fund), \$200.00 per 10,000 miles.	.02	1.62
Tires (sinking fund), \$629.80 for 10,000 miles (averaging 10,000 to 12,000)	.0629	5.0949
Depreciation (sinking fund) based on \$4,019.48 for 10,000 miles..	.04	3.24

Total variable charges per day..... \$14.00895
Total fixed charges per day..... 9.11

Total cost per day..... \$23.11895

The result of these estimates showed that it would cost approximately \$78.76 a day, or \$18,902.40 a year, to operate the routes.

Zone System of Charges

The final step was to estimate the charges to be made in order to produce the amount of revenue necessary to support the system. In doing this a zone system was laid out based on the distances. The previously acquired data showed how much freight would be available in each route, and it was possible to determine very closely the average daily income for each truck. The method adopted, using route 1 again as an example, is as follows:

25,000 pounds haulage daily over this route
Carrying capacity of truck, 20,000 pounds daily
10,000 pounds incoming
10,000 pounds outgoing

"From percentages given and taking into consideration live poultry to be shipped over this route, there would be approximately 18,250 pounds of Class 1 or regular freight, and 1,750 of Class 2 haulage, for which there is an additional charge of 25 per cent.

"There are seven zones on this route, which are divided approximately equal, making about 2,500 pounds of Class 1 freight and 250 pounds of Class 2 freight per day to be hauled over this route.

"This can be tabulated in regard to revenue and according to the above table of zones as follows:

Zone 1, Class 1....	2,500 lbs. at .12	per cwt.	\$3.0000
Zone 1, Class 2....	250 lbs. at .15	per cwt.	.3750
Zone 2, Class 1....	2,500 lbs. at .20	per cwt.	5.0000
Zone 2, Class 2....	250 lbs. at .25	per cwt.	.6050
Zone 3, Class 1....	2,500 lbs. at .25	per cwt.	6.0500
Zone 3, Class 2....	250 lbs. at .31	per cwt.	.7750
Zone 4, Class 1....	2,500 lbs. at .30	per cwt.	7.5000
Zone 4, Class 2....	250 lbs. at .375	per cwt.	.9375
Zone 5, Class 1....	2,500 lbs. at .30	per cwt.	7.5000
Zone 5, Class 2....	250 lbs. at .375	per cwt.	.9375
Zone 6, Class 1....	2,500 lbs. at .25	per cwt.	6.0500
Zone 6, Class 2....	250 lbs. at .31	per cwt.	.7750
Zone 7, Class 1....	2,500 lbs. at .15	per cwt.	3.7500
Zone 7, Class 2....	250 lbs. at .19	per cwt.	.4750
	19,250 lbs.		\$44.7300

Recapitulation of cost and revenue from these estimates gave the following:

	Per Day	Per Year
Total approximate revenue from four routes	\$148.15	\$35,556.00
Total approximate cost of four routes	78.76	18,902.40
Total approximate net profit from four routes	69.36	16,653.60

Total Investment

Four Model 2-E trucks equipped with pneumatic tires, standard Babcock All-Weather cab and special Rural All-Purpose body, at \$4,649.28..... \$17,597.12

In making the final report a number of factors were pointed out. In the first place it was advised that the route should be started in the early fall when the harvest would be ready for transportation and in order to have the winter months to convince the farmers that the new system would be permanent so that they could prepare for increasing production in the spring. It was pointed out, also, that the actual application of the scheme would probably result in developing many changes in regard to the exact routing and the zone charges.

It was noted in the third place that the estimates were apparently calculated to give a rather excessive profit, but that it was necessary that the routes be on a paying basis from the first, especially since at the start there would be many days on which the trucks would not be loaded to capacity.

Fire Prevention Education Legislation

The nation-wide campaign which was inaugurated in the latter part of 1920 by the National Association of Credit Men for the purpose of securing fire prevention education laws in the various states whose legislatures are now in session, is bearing fruit. According to the latest reports, bills have been actually introduced as given in the following list:

California—Assembly Bill 769; Connecticut—introduced (number not known); Idaho—Section 13 of House Bill 54; Massachusetts—House Bill 17; Michigan—Senate Bill 45; Nebraska—House Bill 315; Pennsylvania—House Bill 37; South Dakota—introduced (number not known); Tennessee—House Bill 418; Vermont—Senate Bill 82; West Virginia—House Bill 59.

The Effectual "Stirring Up" of a County to Consolidate Its Rural Schools

By W. S. Fogarty

Superintendent of Preble County Schools, Eaton, Ohio

"ONE of the three counties in the United States having the best rural schools," is the high compliment recently paid the schools of Preble County, Ohio, by a specialist from the United States Bureau of Education. Six years ago the rural schools of this county were of that type found most frequently throughout the United States. Six years ago, as we went over this county and saw forlorn and dilapidated one-room school buildings with ill-kept grounds, while just across the road were beautiful houses with all modern conveniences and fine barns for the stock, we knew that the good rural people of this agricultural county needed to be "stirred up." I had been accused of "going over the county stirring up things," by a very angry farmer when we went into his township to consolidate schools. The dismal one-room "box-car" type of school building with the old, unsightly stove in the center, with white-washed walls discolored by smoke, with cross-lights and window ventilation, with dreary grounds and unsanitary condition in general, presented a sight which made me heartsick for the boys and girls who were so greatly robbed by such an environment.

Consolidation is the key-point of rural school improvement. Six years ago Preble County had 94 one-room schools. Since then we have displaced 71 of these with 12 modern consolidated schools. A large number of the remaining one-room schools are now in process of elimination by our County Board of Education, which has been broad-minded and consistently progressive in all its acts.

The Progressive Policy Won

Bitter opposition was met from the selfish man without children, from the reactionaries who resist all change, from the cheap-school crowd who are satisfied with any school, and from those sentimentalists who were unwilling to give up the "little school-house." The campaigns showed that the

"little school" with its little tax, little children, little attendance and little interest had many little supporters. However, nearly all the campaigns were successful, for a good majority of our farmers recognize that the welfare of our youth is of supreme value, and that the farmer can and should have as good schools as the citizens of the city. Moreover, they know that it is best for their boys and girls to get their high school education at home and spend the night under the parental roof.

In less than nine months, or from November 3, 1914, to July 17, 1915, consolidation projects affecting more than one-half the county were carried, and bonds for new school buildings to the amount of \$306,000 were approved by good majorities. Other projects have followed, until almost the entire county is consolidated and the total expenditure for new equipment has reached about \$450,000. The buildings are well lighted, ventilated and heated. Each has an auditorium, a gymnasium, the usual classrooms, good laboratories, a library and an office.

Improvement of the School Grounds

Remembering the dreary one-room school grounds, which were without flowers and shrubbery and often without trees and grass, it was resolved that these new school grounds should be landscaped and made beautiful. Professor R. B. Cruickshank of Ohio State University, has come to Preble County several times and has landscaped the grounds of our new consolidated schools. He drew blue-prints showing what to plant and where to plant it, and indicating walks, drives, and space for baseball, volley ball, tennis, etc. These drawings have been invaluable to boards and superintendents in developing beautiful school grounds.

Lanier Township Centralized School has a most beautiful lawn with sunken garden effect. The Board of Education bought \$150 worth of trees and shrubbery. The harmony of color and varied shades seen



THE ONE-ROOM RURAL SCHOOL WAS RARELY SATISFACTORY

at different seasons is a constant delight to the eye. The lawn is enclosed with a low ornamental hedge. Flowers are planted along the walks and around the flagpole. These are not placed "just any place," but it is purposed as far as possible to plant the right flower in the right place. The grounds have been pronounced by competent state authority to be "the most beautiful rural school grounds in Ohio."

There are now notable instances of Parent-Teacher Associations helping in this work. In Jefferson Township there stands a large modern consolidated school building on a 10-acre plot. The grounds are bare except for the schoolhouse and a barn for vans. The Parent-Teacher Association of the community saw the need of terracing, planting, and plotting playgrounds. A campaign of education was carried out. In November, an extra mill tax was voted to improve the school grounds. This mill tax has provided a fund of about \$3,000, and work to make these grounds a model of beauty will be started this spring.

Another instance of good community improvement work is in Lanier Township, where parents, Board and teachers spent a day in graveling a part of the school grounds for parking automobiles. Men with 40 teams hauled gravel, and 30 others shoveled. The women used the home economics department for preparing dinner. There were 170 persons present, with a

fine community spirit and a real pride in making their school grounds beautiful and at the same time serviceable.

Good Returns on the Investment

Though the population of this rural county is practically stationary, since 1914 the high school attendance has increased from 523 to 826, or nearly 60 per cent. The bringing of secondary education to 303 more youths in Preble County alone has been worth all the cost of the new movement. After consolidation the high

school enrollment in Lanier Township doubled, in Jackson Township it doubled, in Monroe Township it increased 137 per cent. At present more than 20 per cent of our total enrollment is in high school, a record unexcelled by any other county in the state. To deprive bright farmer boys and girls of a high school education in these times is to limit their success and happiness for life.

These schools are revolutionizing our rural community life. In the auditoriums of these buildings meet Parent-Teacher Associations, Boys' and Girls' Clubs and other organizations of young people, Granges, Farm Bureaus, and other various-named groups. The auditoriums, gymnasiums, dining-room and kitchen of the home economics department offer fine facilities for various entertainments, socials, inter-school literary and music contests, inter-school athletic contests, class plays, commencement exercises, lyceum courses, school exhibits, moving picture shows, and various other community meetings. In Monroe Township the attendance at community meetings in the consolidated school in the open country from September 1, 1919, to May 15, 1920, was 10,280, and \$1,502 was received from meetings charging admission. During the same period Jefferson Township School counted 8300 persons in attendance. In the county for this period the attendance totaled 53,010, which is about twice the

population of the entire county. During the war these buildings were invaluable in furnishing places for large gatherings of the people for Liberty Loan and other patriotic meetings.

The new schools offer a richer curriculum in agriculture, home economics, manual training and art. There is division of labor, and the teacher has time for work outside the book. There are fewer classes, longer recitations and good laboratories. The consolidated school secures better teachers on account of the social advantages and because they can do better work. Our teacher corps, has greatly improved in training and experience. The consolidated school has a great advantage over the one-room school in close supervision over teachers.

The consolidated rural school has an enrollment large enough to give the social and cultural contact with agreeable associates necessary for the best development of child life. Boys' and Girls' Clubs are invaluable in this work of socialization. Literary and athletic leagues play a part. The County Fair Board has provided an entire building for school exhibits and offers a premium list of about \$1,000. A County Play Day is held annually, with an attendance of 3,000 or more persons. Last year 800 pupils competed in over 1,500 entries. Cups, ribbons and pennants were given as prizes.

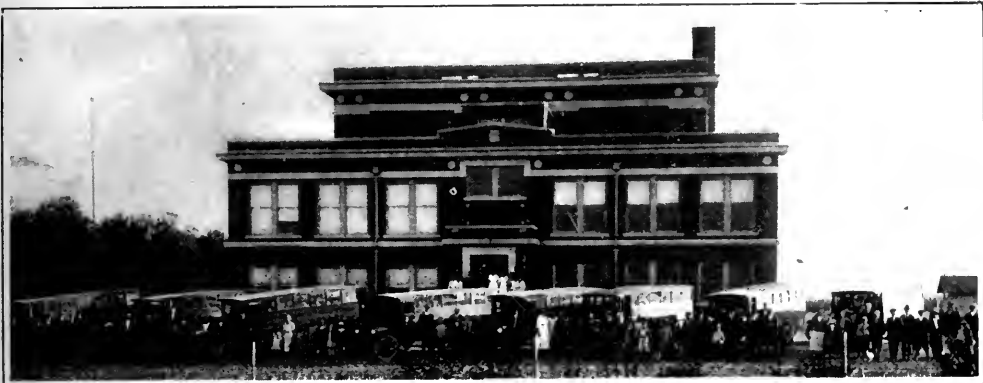
Greater Interest in School Work

In comparing costs of school systems there are several facts other than total costs to be considered. One is the per cap-

ita cost, which is a fair basis. In Monroe Township, which is consolidated, the average annual cost for both tuition and transportation for each child in the elementary school was \$40.62, while in the nearest one-room school the average cost for tuition was \$50.90. In the one-room school, No. 7, Somers Township, which had an attendance of seven pupils, the average cost was \$93.50. The attendance in consolidated schools is better. In Somers Township the attendance for the last year of the one-room system was 81 per cent, and the next year under the consolidated system the attendance increased to 92 per cent. Twin Township and Lanier Township each have the same area, about the same population and topography; the people are much alike; in fact, they are as much alike as two peas in a pod, except that Lanier's schools are consolidated and Twin has the old one-room system. Last year's reports show the following interesting data:

	Twin One- Room	Lanier Consol- idated
Pupils enrolled.....	296	280
Aggregate days of attendance.....	35,948	39,349
Average days per pupil.....	121	140
Days lost.....	3,401	
Months lost.....	170	
Years lost.....	21	

What is a day of elementary education worth? It must be recognized that 3,401 days make a considerable loss. Boys and girls remain longer in the consolidated school. High school attendance greatly increases. Interest in school work is much greater. The value of interest in one's work cannot be estimated in dollars and cents, yet it is of highest value. Many children quit school because the work is



300 PUPILS ARE CARRIED DAILY BY AUTOBUS TO AND FROM THE LANIER TOWNSHIP, OHIO, CONSOLIDATED SCHOOL

poor and uninteresting. The larger and better qualified teaching force, better building and equipment, larger number of pupils, increased socialization of the school, and more work with things of vital interest as found in the consolidated school, are bringing a more abundant life to our rural youth. When talking cost of the consolidated school, let us keep in mind all of the above factors of cost and returns.

Easy Transportation

We are now transporting 2,245 pupils over 60 auto-van routes and 35 wagon routes. The auto van is rapidly displacing the horse-drawn van because the former transports the children in about one-half the time the latter takes. The children come to school in conveyances which are well lighted, ventilated and heated. Their clothing and feet are dry. They are not

exposed to wind, snow and rain. Our experience is that there is less sickness in schools with transportation. There is no fighting or immoral conduct to and from school, as the driver of the van has charge over pupils while in his care. Hear what one farmer says:

"Think of the little children plodding schoolward in cold, wet and mire! Then count up the number of days they are kept home altogether because of bad roads and severe weather."

Our county educationally has been revolutionized, and every rural community is enjoying a bigger, broader and richer life through the community activities of these consolidated schools, more young men and women are staying on the farms, and people are forming more congenial acquaintances through the medium of the consolidated school.

They Beat Us—Glory Be!

A Contribution Received by THE AMERICAN CITY from a Southern Mayor
Who Was Not Reëlected

FOR six years we have been the public complaint box and footwiper; we have settled land disputes, family disputes, dog disputes and some unfair accounts; we have been insulted, disgusted, spat upon and imposed upon; we have been handed bunches of flowers at the one hand and a black eye at the other; we have locked up culprits for wrong-doing and then envied them their places in limbo; we have been blamed for stopped sewers, blocked streets, heavenly showers, poor telephone service and the present price of cotton; we have been cursed for cutting trees and threatened with death for allowing other trees to stand; we have been black-listed for the bum work of one policeman and ostracized for the sterling work of another; we have been called a liar until we almost believe it; we have become widely known as a grand rascal, an arch criminal, a desperado, a policy-player and a bigoted fool; we have been credited with buying property with town funds, removing our own property from the tax books and accused of attempting to give the Presbyterian Church a title to the town hall; we have been charged with false arrest, false statements and other faults; when we smiled

they said we were a fool, and when we frowned they said we were a bully; mothers accused us of overrunning the town with dogs, and the dog owners blamed us for the deluge of babies; one bunch wanted hogs in town, while others said there were too many hogs already; they cursed our name when mosquito time came; they yelled at us when the ditches ran over after having them filled to capacity by the Good Lord; they blamed us for the many peculiarities of their neighbors, their neighbors' chickens, dog, man servant, maid servant and mule;—when the baby had whooping-cough it was because we had allowed a north wind to blow, and when it had the colic it was because we had allowed the dope fiends to exhaust the supply of paregoric at the drug stores; some wanted the Confederate Monument to face south, while others said we should take the old man's hat off when the Civic League paraded by; one called us a gentleman and was promptly slugged by one who said we were a bum; they blamed us for this, and they cursed us for that—they heaped all of the troubles of the universe upon our weary bald pate—and then lifted all of our burdens by beating us at an election—Glory Be!

Startling Figures for Automobile Fatalities

By C. W. Price

General Manager, National Safety Council

THE automobile has suddenly thrust upon the people of the United States a problem more alarming and more far-reaching than any other in the history of the safety movement. Two striking facts reveal the seriousness of this hazard:

First, one-half as many people were killed by automobiles in 1919 in the United States as were killed by accidents in all the industries, on all railroads, and in all mines combined; second, probably not more than one-third of the people of the country are exposed to industrial hazards, while possibly every man, woman, and child who walks out of his front door is exposed to this new and giant hazard which stalks down our streets and highways.

Thousands of automobile accidents have happened because the drivers did not know their machines, did not know how to drive or maintain them. Years of experience are required before an engineer is allowed to run a locomotive, but we allow a boy of eighteen or twenty years, with only a few superficial instructions, to drive a monster truck down our streets threatening many more lives than any locomotive which is confined to two steel rails.

If we are to train drivers of automobiles and trucks to be safe, we must first furnish them with specific information covering the inspection, repair, and operation of their machines.

The engineering staff and the Public Safety Section of the National Safety Council have given the greater part of a year to the preparation of a set of twelve safety lessons for automobile drivers. Although these lessons were prepared primarily for the members of the National Safety Council, in the interest of accident prevention we shall be glad to afford the readers of THE AMERICAN CITY the opportunity of distributing copies of these lessons to their automobile drivers.

Deaths and death rates from automobile accidents, reported by the U. S. Bureau of the Census, are shown in the following column.

CITY	Number of Deaths		Rate per 100,000 Population	
	1919	1915	1919	1915
Akron	32	19	15.9	13.5
Albany	23	17	20.4	16.0
Atlanta	43	11	21.7	6.1
Baltimore	106	36	14.6	5.8
Birmingham	21	13	11.9	8.2
Boston	125	57	16.8	7.9
Bridgeport	33	18	23.4	14.5
Buffalo	68	42	13.6	9.0
Cambridge	21	11	19.2	10.3
Camden	26	17	22.6	16.0
Chicago	328	212	12.3	8.6
Cincinnati	67	30	16.7	7.6
Cleveland	126	73	16.0	10.6
Columbus	40	16	17.1	7.6
Dallas	19	(1)	12.1	(1)
Dayton	16	7	10.5	5.1
Denver	41	13	16.1	5.5
Detroit	139	89	14.4	12.2
Fall River	9	9	7.5	7.5
Grand Rapids	16	11	11.7	8.8
Hartford	38	19	27.9	15.8
Houston	14	(1)	10.3	(1)
Indianapolis	26	15	8.4	5.5
Jersey City	40	19	13.5	6.7
Kansas City, Kans.	11	3	11.0	3.2
Kansas City, Mo.	42	29	13.1	10.0
Los Angeles	119	74	21.1	15.9
Louisville	19	17	8.1	7.3
Lowell	21	4	18.7	3.6
Memphis	26	12	17.4	8.5
Milwaukee	60	10	13.2	2.4
Minneapolis	38	26	10.1	7.6
Nashville	18	4	15.3	3.5
New Bedford	15	12	12.5	10.9
New Haven	24	12	14.9	8.1
New Orleans	36	17	9.4	4.7
New York	780	351	14.0	6.8
Newark, N. J.	82	30	20.0	7.8
Norfolk	24	4	21.1	4.0
Oakland	35	20	16.4	10.8
Omaha	28	9	14.8	5.3
Paterson	27	9	20.0	6.9
Philadelphia	191	91	10.6	5.4
Pittsburgh	94	51	16.1	9.1
Portland, Ore.	31	17	12.1	7.3
Providence	46	35	19.4	15.1
Reading	10	12	9.3	11.6
Richmond	10	11	5.9	6.9
Rochester	32	18	10.9	7.1
St. Louis	105	58	13.7	7.9
St. Paul	23	9	9.8	4.0
Salt Lake City	13	13	11.1	12.3
San Antonio	14	10	8.9	7.6
San Francisco	85	68	16.9	14.6
Scranton	20	10	14.6	7.5
Seattle	50	27	16.0	9.7
Spokane	12	15	11.5	14.4
Springfield	22	14	17.3	12.6
Syracuse	23	12	13.5	7.7
Toledo	34	15	14.2	7.3
Trenton	15	6	12.7	5.5
Washington, D. C.	58	18	13.4	4.6
Wilmington, Del.	18	9	16.8	9.1
Worcester	25	17	14.0	10.4
Yonkers	18	5	18.1	5.5
Youngstown	36	14	27.7	12.7

(1) Nonregistration.

Each year the death rates from automobile accidents are higher than the rates of the previous year. Each year it becomes more and more dangerous for a person to walk

the streets. The reason usually given, and probably the correct one, is that the number of automobiles in use is constantly increasing. How then shall this ever-increasing danger be lessened? The obvious remedy is to improve constantly the traffic regulations to keep pace with the ever-increasing number of automobiles.

This call for better and better traffic regulations is not a fanciful one. Everyone is familiar with the necessity for slow and orderly progress when a crowd emerges from a circus tent, and, similarly, automobile traffic must be slowed down and controlled until it becomes safe.

The 1919 rates for Kansas City, Mo., San Antonio and Cleveland—all much lower than for 1918—furnish a ray of hope that we are finally waking up.

The following are a few suggestions for traffic improvement:

- I. At street crossings the erection of curbed safety islands, which, at the most dangerous spots, should be very close together
- II. Construction of additional crossings in the middle of blocks, where automobiles can approach from only two directions
- III. Demonstration of great skill in driving each machine before granting

a driver's license for that machine

- IV. Reduction of the speed limit, especially at crossings

- V. Fine, revoking of license, and imprisonment, each to have its place as an actual penalty

The tendency of some writers to exonerate automobile drivers and to place the blame of accidents upon pedestrians, indicates lack of a full comprehension of the problems involved.

The teaching of caution is admirable, and in time pedestrians will undoubtedly become more and more careful, but there will always be on our streets the person who misjudges the speed of an approaching automobile and, becoming confused, knows not which way to go; there will always be the child who has not yet acquired the ultra-cautious habit; and there will always be old people who can not hear and see so well as they used to and who are not so keen and active as they once were. The preaching of more caution to these people will never be sufficient. They must be protected by additional safeguards, and city governments which will continue to make their traffic regulations more and more rigid till they can point to low death rates from automobile accidents will deserve the commendation of all thoughtful people.

City Dance Hall Regulations

The following suggestions for the regulation of public dances are offered by *The Survey*. They are based upon investigation of 600 cities in the United States:

The creation of a uniform minimum age law. Mere children should not be allowed to dance with men they do not know. Minors should be defined as being at least eighteen years of age, and none should be allowed in the public halls without parents or guardians.

The necessity of a license fee.

More definite and direct control by a city department of ventilation, sanitation, lighting, toilets and dressing-rooms.

A uniform closing hour. Public dance halls should not keep open after 11 P. M. Investigation reveals that later hours are a contributing factor to possible delinquency. Nearly all other forms of amusement are quite generally closed at 11:15 o'clock—why not dance halls?

Continued vigilance as to possible sale of liquor. There is evidence that drink is being sold at dance halls during the "dry" period. Dance hall legislation must prohibit not only sales but also the entrance of intoxicated per-

sons.

Censorship. Every city should have an inspector of dance halls connected with the board of public welfare. Police women should be appointed, who should have official status as regular police officers. Inspectors should be paid a sufficient salary and be held responsible for the enforcement of all ordinances concerning dance halls. Every dance hall should have a police woman and dance hall matron in attendance during the entire evening, and their services should be paid by the management.

The owner of the building as well as the manager and promoter should be held responsible for any possible misconduct, and forfeiture of the license should take place after two offences. Matrons and police women should be persons of exceptional moral character and well versed in the technique of the modern dance. Pass-out checks should not be allowed. Young boys and girls with sportive tendencies should be reported to their parents, and, if advice is unheeded, dealt with by the proper public agencies.

Necessity of a city ordinance that will cover all these items.

A School Publicity Program

By Clyde R. Miller

Director, Division of Publications, Board of Education, Cleveland, Ohio

BIG city schools get plenty of publicity as a rule, but, unfortunately, much of it is the wrong sort. Many newspaper editors and reporters seem to think that a good school "story" is one which features a dispute among members of the board of education, or tells of a quarrel between the school board and the superintendent, or describes some regrettable fracas in the schools. All these things make more or less interesting copy. But they are not the only things which make good copy.

Said the editor of a great American daily to the writer not long ago: "I have often wondered why professional educators have been so slow to understand the value of good publicity. True, many newspapers do seek to play up the sensational, but in very few cases have the school superintendents and other school authorities taken the pains to show the newspapers that the schools are simply full of interesting, constructive stories. Can you, for a single moment, imagine an industrial or commercial enterprise of any consequence which does not spend time, energy and money to advertise itself favorably? Why don't our public school systems take a lesson from our progressive business men?"

In the city of Cleveland, the Board of Education is carrying out a publicity program which aims to accomplish all that is suggested in the quotation from the editor, and more.

Last year the Board created a Division of Publications to carry on the program. Now, as a matter of fact, there is little for this Division to do in the matter of changing the attitude of the Cleveland dailies towards the schools of the city. For some years the Cleveland dailies have been turning more and more towards a constructive choice and treatment of school news. They do not avoid or ignore the shortcomings of the schools or of the officials responsible for the schools, nor are they requested to avoid or ignore. What is important—they do seek school news which actually shows what is going on in the system, good as well as bad. When the press in any town is willing to see news in constructive as well as

destructive events and situations in the public schools and is willing to "play up" the good as effectively as it features the bad, the schools stand a fair show of appearing in a correct perspective. And that perspective, in most large cities, will show the good dominating.

Naturally, the Division of Publications of the Cleveland schools seeks to make it convenient for the newspaper men to cover school news. The Division does not prepare any copy for the daily press. It does not hold itself responsible for "covering" the schools for the press. But it is creating in the system a willingness on the part of school executives to give instant and cordial coöperation to the press. It is encouraging the newspaper men to "get out into the system" for their school news. After all, the most important happenings in a public educational enterprise are not the official doings of the headquarters. They are happenings and conditions directly concerned with the actual work of educating boys and girls. You find them in the schools, not in the office of the superintendent or of the president of the school board. Efforts are being made in Cleveland to develop a news sense in teachers and principals so that they can deal directly with newspaper men.

The School Publications

Two other activities keep the Division of Publications busy, and these, too, parallel the activities of a progressive industrial or commercial business. The Division publishes, fortnightly, a school house organ, a small newspaper, for teachers and citizens; every now and then the Division publishes in booklet form an account of some particular phase of the work and interests of the schools.

The name of the little newspaper is *School Topics*. It reaches all of the 4,000 teachers in the Cleveland system and hundreds of citizens besides. Dry, dull pedagogical stuff doesn't get into *School Topics*. The paper's first rule is that copy for it must be interesting, attractive, readable. The director of the Division of Publications is the editor. He is a former newspaper man

who has been closely in touch with school activities for some years.

School Topics had an important part in the Cleveland schools' recent and successful campaign for increased taxes and for a \$15,000,000 bond issue for new buildings. It presented the financial facts of the school system in an understandable way. The teachers passed these facts on to the pupils, and the pupils got them over to the fathers and mothers. The policies of *School Topics* are formulated by an editorial board on which the teachers have as much to say as the representatives of the Superintendent and the Board of Education.

In this little newspaper of four pages (10½ inches wide by 14 inches deep, and four columns to a page) are set forth the general policies of the Superintendent and of the School Board. By presenting these in new style—which means putting in the essential and omitting the unimportant and uninteresting—*School Topics* gives to the entire teaching corps of 4,000 persons some very definite ideas of the aims of the school system as a whole. This makes possible a more intelligent working together.

This feature of *School Topics* comes into

play, also, in making even more effective a correlation which is one of the outstanding things in the Cleveland system—the correlation of schools, art museum, public library, various civic organizations, and even the stores and factories of the city. It is a common thing in Cleveland for pupils and teachers to go to stores and factories to study salesmanship and manufacturing processes.

There is space for the Cleveland Art Museum news in *School Topics*. There is a regular column of "Book Chat," supplied by one of the Public Library staff, and filled with gossip of interest to any lover of books, and of particular interest to teachers.

Another aim of *School Topics* is to develop in the minds of its teacher-readers the fact that the Superintendent of Schools and the members of his staff are real flesh-and-blood folks. True, a large city school system must run like a machine, but in most cases there is more than mere mental ability in the running of the machine; there is plenty of heart, too. By trying to reveal the human side of the school machine, by showing the headquarters reasons and the headquarters philosophy, *School Topics* seeks to build up a school morale which will make for understanding, contentment, efficiency.

Occasional booklets published by the Division set forth in popular style some of the specific activities going on in the schools. There is, for instance, a booklet telling of the work of the school medical department; one called "Getting Out the High School Paper," descriptive of practical high school journalism; one which pictures an interesting course in garment-making for sixth grade girls. Many others are to be published.

These, too, are for teachers' reading. Besides, they are made available to the general public through the many branches of the Public Library. Not infrequently the material in such a booklet becomes the basis of a prominent feature story in one or another of the daily papers.

It's a big job. It's a job not to be completed in one year or in two. There must be constant effort in every big school system to assure understanding, interest and enthusiasm on the part of both teachers and public. The Cleveland Public schools, following the example of progressive business men, are finding that it pays to advertise.



A LESSON IN MUNICIPAL FINANCE THAT
"GETS ACROSS"

Forward Steps in Municipal Affairs

Police Departments

Policewomen in Detroit

DETROIT, MICH.—The profession of the policewoman is new and not thoroughly understood. Some of the earlier choices for the work were unfortunate, as the interpretation of the policewoman's function was that of the old police strong arm methods and along punitive rather than protective and preventive lines. The newer interpretation contemplates a much broader scope and a more effective service. For a successful working basis certain fundamental factors are recognized:

1. The need for trained personnel. The so-called delinquent girl, or the girl on the border line of delinquency, presents quite the most complex problem in the field of social service, and to deal with the various elements found in this type of girl requires intelligent and expert service.

2. The place of the policewoman in the community is a definite one. She should not usurp the function of other organizations, such as probation or parole officers, employment bureaus, or the private protective agency. Her largest service can be done by utilizing all these other agencies for the continued oversight of the girl who may have first come under the notice of the policewomen, but who needs constant and individual care over some definite period of time for the purpose of reestablishing her in society. The unit by which policewomen measure their success should not be the number of arrests made, but rather the number of arrests prevented.

The new Women's Division of the Detroit Police Department, just now in the process of organization, is based upon this understanding of function. For the purpose of administration, the Women's Division has four different departments:

1. Protective
2. Under-Cover
3. Patrol
4. Office

The women assigned to the Protective Department are in and about the commercialized amusement places, railway and interurban stations, or wherever young girls are likely to be in any considerable number.

Their first duty is not to arrest these girls, but to try to discover if they are in any moral danger, and if so, plan to refer them to other organizations already existing, or to their parents, to give them any further oversight needed.

Under-Cover work is the securing of confidential information on various matters without the identity of the policewomen being known. Frequently the most valuable and most authentic facts are so obtained, upon which definite arrests may be made or other necessary action taken.

The Patrol Division is upon the streets for the discovery of law violations which involve women and girls.

The Office Department looks after investigations, interviews, and complaints, and decides what action should result from certain information thus obtained. Sometimes this involves mental and physical diagnosis and working out plans for constructive treatment. Too much emphasis cannot be laid upon the necessity of trained women for this work.

For the present, the Detroit policewomen are confining their efforts to work with girls between the ages of 17 and 21 years and all women and girls who are first offenders, because the state provides no constructive treatment or care for the woman with fixed habits of misconduct. The policewomen are planning only to study this group, who are known as "repeaters," for the purpose of obtaining social, physical and mental data, in order to emphasize the need for state custodial care over a longer period of time—for the definitely feeble-minded girl custody until her childbearing period

is over, and for the mentally normal girl an indeterminate sentence for not less than three years in some good reformatory. The greatest care should be taken in establishing such an institution. The location should be remote from any city, on good, workable farm land and the whole work should be in charge of a woman who has the right understanding of the girls who come committed to her care.

The Women's Division of the Police Department should be only an additional social organization in any community for the constructive treatment of the girl who has fallen into anti-social habits.

MISS VIRGINIA M. MURRAY,
Director, Women's Division, Police Department.

Public Welfare Departments

Montreal Cares for Homeless Men

MONTREAL, CAN.—The Meurling Municipal Refuge has been in operation since the 23d of March, 1914. This establishment, which is unique in Canada, cost \$180,200: land, \$45,000; construction, etc., \$121,800; and furniture, \$13,400. The capacity is 703 beds.

The building, which is simple and without any luxury, is quite safe, comfortable and solid. It is entirely fire-proof. The machinery and furniture are modern and practical. As to the regulation of the Refuge, it will be seen by the details given below that, though it is severe, it is in no wise complicated and that it affords all possible guarantees both from a sanitary and from a moral standpoint.

The hour of admission is 6:30 o'clock P. M. in summer and 5 o'clock P. M. in winter. To be admitted into the Refuge, one must not be intoxicated, must not have in his possession more than 10 cents, must be polite, and must conform to all the regulations of the institution. The persons who desire to be harbored in the Refuge are admitted by a side alley. They enter a waiting-room and thence pass through a corridor and stop in front of a wicket, where each must give his family and given name, his age, his civil condition, his nationality, and his trade, and state how long he has been in Canada, how long he has been out

of work, and, finally, the reason why he left his last position. After this a search is made in his pockets, and everything that might be a hindrance or that might damage the clothes while fumigation is being carried on is removed. Each man is then supplied with 3 checks provided with a string and bearing his inscription number, and is taken to a room situated in the basement, where he is given a bag and a clothes-hanger; he must put his underclothes in this bag and close it after having affixed thereto one of the three checks given to him when his name was registered; on the clothes-hanger he hangs his trousers, his vest, his coat and his overcoat and attaches a check to it; his shoes and his hat are deposited in a compartment bearing a number corresponding to that of the checks; the third check, which has a longer string than the others, is placed around his neck. The object of this check system is to identify the individual, when, on the following morning, his clothes are given back to him.

The inmates' clothes, with the exception of their shoes and hats, are placed in the fumigator, where they remain during 30 minutes at a temperature of 300 degrees. Once the inmates have taken off their clothes they go to the shower-bath room, where soft antiseptic soap is put on their heads; all the shower-baths are put in operation simultaneously, under the direction of an employee; the water is, practically speaking, always at the same temperature, varying from 80 to 90 degrees. After taking a bath, each man undergoes an examination in the physician's office. If, in the course of the examination, it is found that the person who seeks a shelter at the Refuge is ill, the Superintendent must have him admitted to a hospital and attend him in the meantime, in order that he may be again in a position to earn a living and also in order to protect the other inmates in the event of this sick person's being affected with any contagious disease. The medical examination has also another object, that of ascertaining the working capacity of those who seek a shelter at the Refuge, in order to find out the imposters who are in the habit of living at the expense of the community and thereby protect the honest paupers. The inmate is immediately vaccinated if he has not been already inoculated.

Once his medical examination is com-



MONTREAL'S MUNICIPAL REFUGE CAN SHELTER 703 HOMELESS MEN

pleted, he is given a nightgown, and the elevator takes him up to the refectory, the supper consisting of bread and a bowl of coffee or soup. He is then taken up to the dormitory. He sleeps in an iron bed (the mattress being entirely of metal) bearing his inscription number. The bedding consists of two blankets, two sheets, one pillow and one pillow-case. The inmates must get up at 5 o'clock in summer and 6 o'clock in winter. As soon as they are out of bed they must go to the lavatory and wash themselves. The sheets and pillow-cases used during the night are thrown into a chute leading directly to the laundry. The breakfast is served immediately after; it consists of bread and coffee or oatmeal. After taking his breakfast, the inmate hands over to the employe on duty the three checks received by him; in return, the employe gives him the envelope in which the contents of his pockets had been deposited at the time of his registration. Then the officer in charge chooses those who are to clean the building and help to do the work about the laundry. The other men are also provided with work if there are any demands from employers.

The annual expenses for the maintenance of this institution are about \$20,000 a year, a small figure in consideration of the work accomplished.

A. CHEVALIER,
Superintendent, Municipal Assistance Department.

Recreation Departments

Municipal Opera a Success in St. Louis

St. Louis, Mo.—The third season of open air opera under municipal direction in St. Louis closed July 31, and a statement of attendance just issued shows that this summer's season was presented to audiences totalling 16,000 more than comprised the audiences of the largest preceding season.

The growth of municipal opera in St. Louis is remarkable. In these days when one reads of important opera companies of America losing from \$50,000 to \$250,000 annually, the news that the St. Louis municipal venture is self-sustaining is reassuring proof that opera can be made profitable under proper management. However, it is the community and civic spirit in St. Louis that "puts over" municipal opera. St. Louis pioneered in this field in 1919 and the weather man conspired against the enterprise. In six weeks the first year's attendance totalled 86,736 and the receipts \$65,473.75. Miserable weather conditions prevailed during the first three weeks of the venture, and on account of this, together with the newness of the idea, chances for an even break financially seemed slim. But



THE STAGE OF THE ST. LOUIS MUNICIPAL THEATER IS OVERHUNG BY GREAT TREES

Henry W. Kiel, Mayor, of St. Louis, called a meeting of the important civic leaders and representatives of the press and plans were formulated for getting the people of St. Louis out to the magnificent open air theater in beautiful Forest Park, where the opera performances are given, to show them what St. Louis was trying to do in the way of summer entertainment and community service. The final four weeks of the first season saw a material increase in patronage and only a small deficit remained after the season ended. This deficit was made good by public-spirited guarantors.

The second season of municipal opera—that of 1920—was presented under more favorable weather conditions. Forty-eight performances were given in an eight weeks' season, with a total attendance of 204,000 and receipts of \$139,732.50. The profit on the season wiped out the deficit of the first

season and also made possible a number of permanent improvements in the theater and its equipment.

This summer's season called for eight weeks with six performances weekly. Rain necessitated the cancellation of two performances and interfered with the presentation of nine others. But the people of St. Louis were "sold" on the municipal opera idea and the attendance record for the season shows that 220,363 persons witnessed the forty-six performances, with resultant receipts of \$163,873. When it is taken into consideration that general business conditions this summer were far less favorable than those of 1919 and 1920, causing a marked decrease in attendance at entertainment offerings of all kinds, the showing of municipal opera in St. Louis is remarkable.

SARAH WOLF,
Secretary, Municipal Theater Association.



THE PEOPLE OF ST. LOUIS ARE "SOLD" ON MUNICIPAL OPERA

Is the Term "Zoning" Improperly Used?

TO THE EDITOR OF THE AMERICAN CITY:

An editorial comment in "Garden Cities and Town Planning" for June very properly condemns the use of the word "zone" in connection with the fixing of areas for residences, factories or shopping areas in town planning schemes. There is no doubt about the meaning of the word zone. "To zone" is "to encircle" and a zone is a belt or girdle. In America it has been applied to town planning areas of the character of blocks or sections rather than girdles. If it continues to be so used, the next logical step will be to speak of town planners as zonists, and to describe different cities as zonate, zoniferous, or zonular, as the case may be. Where the zone has a tail or excrescence, it should be called zonurus. If a piece of so-called zoning were particularly clever, we might, without much departure from correct derivation, speak of it as an example of zonotrichia. The term zone is so inaccurate, as it is used, that one may be forgiven for being facetious on the subject.

In Britain and the British Dominions the term is used with its proper meaning. For instance, an agricultural belt round a garden city is a "zone," while in Ontario the term "zone" is used to define the rural area surrounding a city, which should be planned with the city, as being an "urban zone."

EDITORIAL NOTE.—Any suggestions on the terminology of city planning from so eminent an international authority as Mr. Thomas Adams, of Ottawa, Town Planning Adviser of the Commission of Conservation, merits the careful consideration of THE AMERICAN CITY'S readers. The editors believe, however, that the terms "zone" and "zoning" have already become so firmly established in the laws and literature of city planning in America that any attempt to substitute other terms would be futile. That the words have come to connote something different from their original meaning is a condition for which there is ample precedent in the English language. Most of our cities, for example, have "squares" the shape of which Euclid would scarcely recognize as such; and most of the "parking" of automobiles is done in places other than parks.

In both these cases the term is used to indicate a belt or girdle of land round the city or town. This is strictly correct. With the coming of regional planning it is important that we should adhere to this proper use of the word "zone" so as to define the area surrounding a city that should be planned along with the city.

It is essential, however, in connection with town planning to have an unambiguous terminology. The words I suggest are as follows:

Zone Areas or Zoning.—Belt or girdle of land surrounding a city or town either classified to be used for agricultural purposes or coming within the influence of the development of the city. For instance, the agricultural belt of a garden city or the urban zone comprising the rural land within five miles of a city boundary to be included in the area of a city or town plan.

Delimited Areas or Delimiting.—The delimiting of areas for the purpose of regulating and restricting height, use and density of buildings. (Delimiting has a relation to all three purposes of use, height and density.)

Use.—The use to which buildings are delimited for residence, industry or business.

Character.—In some cases alternative to *Use*, but more concerned with appearances of individual buildings, the character of their design, and mass.

Height.—The height prescribed in delimited areas.

Density.—The amount or extent of area of land upon an acre or lot that may be built upon; indicating the proportion of mass of building to the area or volume of land occupied. (Substitute for "area of occupancy" or "bulk.")

I think the above gives us the best list of town planning terms in accordance with the roots of the words used, and it were well for us to adopt some uniform terminology in connection with town planning in English-speaking countries.

THOMAS ADAMS.

The Progress of Zoning

According to *The Toledo City Journal*, sixty-seven cities in the United States are reported to have some kind of zoning regulations now effective, and twelve cities have complete, comprehensive zoning ordinances limiting the use of property, heights of buildings, and area of lot that may be covered in every city block within the city limits.

Additions to a Water Filtration Plant

Middletown, N. Y., Adds Filters, Chemical Control Apparatus, Clear Well and Chlorine Control Apparatus

By John A. Korschen

Commissioner of Public Works, Middletown, N. Y.

THE water-works of the city of Middletown, N. Y., is divided into two systems, the gravity system and the high-pressure system. The former, also known as the Monhagen system, is supplied by two reservoirs, the Shawangunk and Monhagen Lakes having a combined capacity of 730,000,000 gallons of water. The high-pressure or Highland system is supplied by Highland Lake, which has a capacity of 560,000,000 gallons.

Prior to the first of September, 1920, the water in the Monhagen system was filtered by means of four concrete and four wooden gravity filters having a total normal capacity of 4,000,000 gallons. After passing through these eight filters the water was stored for consumption in a concrete clear-water basin of about 90,000 gallons capacity. The four wooden filters were installed in 1900, and owing to the corrosion of the straining system the efficiency of these filters was reduced about 50 per cent. The average daily consumption on this system is about 3,000,000 gallons.

The water in the Highland system was filtered by means of four steel pressure filters having a total normal capacity of 1,000,000 gallons. This water is filtered directly into the main. The average daily consumption on this system is about 600,000 gallons.

The city of Middletown is steadily gaining in population, and as a consequence the consumption of water is likewise increasing. Furthermore, the worn-out condition of the four cypress tanks in the Monhagen system necessitated immediate action. Upon the recommendation of the writer it was decided to remove the four cypress tanks and replace them with six reinforced concrete gravity filters having a total capacity of 3,000,000 gallons. It was decided to add two steel pressure filters having a capacity of 500,000 gallons. Outside of the filter plant building it was decided to construct a reinforced concrete clear-water basin with a capacity of 250,000 gallons.

Plans and specifications were made and bids were opened in August, 1920, and the reinforced concrete work was awarded to M. J. Cleary, contractor, of Middletown, N. Y., for \$21,583. The installation of the filter equipment, pressure filters, wrecking wooden tanks, controller and loss of head gages, chemical mixing apparatus and sampling devices was awarded to James E. Williamson, engineer and contractor, New York City, for the sum of \$33,717. The Wallace and Tiernan Company, Inc., Newark, N. J., was awarded the contract for the installation of a direct-feed chlorinator on each system for the sum of \$1,732.35.

The above-mentioned work was started September 1, 1920, and is now practically completed. The changes and additions have increased the filtration capacity on the Monhagen system from 4,000,000 to 5,000,000 gallons a day, on the Highland system from 1,000,000 to 1,500,000 gallons a day, and the storage of filtered water from 90,000 to 340,000 gallons.

Detail Description

The reinforced concrete clear well is 75 feet square by 6 feet 4 inches deep, inside dimensions. The floor is 6 inches thick, the roof 8 inches, and the side walls 12 inches thick. Inside there are 16 reinforced concrete columns, 18 inches square, placed 15 feet on centers, supporting the roof. At each side wall there are four reinforced concrete brackets, 15-foot centers, supporting the roof. The footings under the walls are 12 inches thick, and under the columns 1 foot 9 inches thick. The proportions used in the concrete were 1 volume cement to 2 volumes of fine aggregate and 4 volumes coarse aggregate for all concrete work required to be water-tight and in all reinforced concrete sections 9 inches or less in thickness; other concrete was of the proportions of 1:3:5 cement, sand and ballast, respectively. The pouring of the concrete was continuous until the work was com-

pleted. Corrugated bar reinforcement was used and the amount was limited to 100 pounds of steel average per cubic yard of concrete placed. The adjoining rods overlap 25 diameters and were so placed as to break joints on the splicing. The roof of the well is about 2 feet above the level of the ground and is covered with 3 feet of earth evenly spread, rolled and seeded. The well has two manholes diagonally across from each other, and four cast iron vents. This new clear-well is located just outside of the filter plant building and is connected with the old clear-well by a 12-inch cast iron pipe.

The floor under the new concrete filters was reinforced with 2 reinforced concrete beams. The six new concrete filters were poured continuously and are 16 feet 10 inches long by 11 feet 4 inches wide by 7 feet 8 inches deep. The reinforcement and proportions for the mixture were the same as mentioned above. Each of the filters is provided with a straining system consisting of a cast iron header, 60 cast iron laterals and brass strainers. There are 11 brass strainers in each lateral except in the end laterals, where they are placed a little closer. The headers are rectangular, 8 inches wide and $6\frac{1}{4}$ inches high inside, and the laterals are cast iron pipes $1\frac{3}{4}$ inches inside diameter, with an elbow outlet at the free end. This elbow end is also provided with a brass strainer. The laterals were embedded in concrete to the top of the pipe and the surface carefully troweled smooth and level. Upon this concrete was placed a bed of clean, hard, screened and selected gravel, 14 inches deep, in layers of different grades with the coarse layer 3 inches deep on the bottom; there were 7 different grades of gravel, the top layer passing through a $3/16$ -inch screen and retained on $1/10$ -inch screen and placed $1\frac{3}{4}$ inches thick or deep. Upon these successive layers of gravel was placed a bed of sand, which after settling with water was not less than 27 inches deep.

Each of the six new concrete filters is provided with an influent regulator, the valve of which is operated by means of a copper float.

The two new steel pressure filters were connected in battery with the four existing pressure filters. These tanks are 8 feet inside diameter and 10 feet inside length from crown to crown of dished heads.

They are provided with a strainer system consisting of a cast iron header, cast iron laterals and brass strainers, all of which are bedded in concrete in the same manner as mentioned before. The tanks are provided with a filter bed of gravel and sand, the same as was put in the gravity filters, except that the sand bed is 34 inches in depth instead of 27 inches.

The four old and the six new concrete filters are provided with effluent rate of flow controllers and loss of head gages. These controllers are of a self-contained type wherein the differential head produced by the passage of water through sections of the controller of different diameter, serves to operate through the medium of a rubber diaphragm a balanced valve, and to maintain the rate of flow through the controller constant within 3 per cent of the rate for which the controller is adjusted, and throughout the working range of head at the filters. Each controller has a normal capacity of 500,000 gallons per day of 24 hours and is provided with an index plate of brass marked to indicate 50,000-gallon subdivisions. The loss of head gages are mounted on columns above the operating platform. The diameter of the gage is 7 inches and indicates the loss of head at each filter interpreted as the difference in head of the normal water surface in the filter tanks and the head at the inlet to the effluent controllers. The gages have silver-plated dials with markings graduated in feet and tenths of a foot.

A chemical mixing and feeding apparatus was also installed consisting of two cypress solution tanks, each 3 feet 6 inches in diameter and 4 feet high, a "booster" tank of cast iron 16 inches inside diameter and 24 inches inside depth, an orifice tank constructed of stone slabs and water and chemical piping for the gravity filters, and a pressure alum tank and differential pressure tube with piping for the pressure filters.

The specifications for the above-mentioned work were subdivided into Division "A" and Division "B," the former consisting of the excavation and grading and reinforced concrete work, and the latter, or Division "B," consisting of the rest of the improvement, as mentioned above, the equipment of the six new concrete filters and installation of connecting mains, the installation of two new steel pressure filters

complete with connection mains, the effluent rate of flow controllers and loss of head gages, furnishing and installing the chemical mixing and feeding apparatus, furnishing and installing the sampling devices, and furnishing and laying all piping to completely connect up the work. There were six bids on Division "A" ranging from \$21,-

583 for low bidder to \$31,375 for high bidder, and for Division "B" we received three bids ranging from \$33,717 for low bid to \$39,000 for high bid.

As mentioned before, the entire contract is practically completed and the work has been done in a most satisfactory manner.

Constant Care of Park Trees and Shrubs Necessary

WITH the return of the open season in our public parks, comes a marked renewal of public interest in these invaluable recreation centers. The outstanding result of this renewed interest is the fact that the public is awakening to the present unsightly and unkept condition of the parks.

While there are competent and sincere officials in charge of our parks, it is also true that a great number are selected for political reasons only, without a thought as to their competency or their knowledge of the work they are expected to properly direct or to do. And, as a sequence, the already large appropriations are squandered, with very little that is concrete to show for the year's work and expenditure.

The existence of fine specimen trees and shrubs in our parks which have required many years to develop, does not indicate that such trees need no further attention. On the contrary, a tree which has taken years to develop may be wholly lost or seriously injured in a single season for want of proper attention in removing dead wood or insect pests, or from the lack of good soil, or other causes. Unfilled cavities and dead wood not only aid in the destruction of trees and shrubs, but mar the beauty and destroy the landscape effect, as



AMERICAN ELM, AN ATTRACTIVE AND VALUABLE TREE FOR STREET, AVENUE AND PARK PLANTING

do also dead trees and shrubs not removed.

Cannot the awakening interest and efforts of public-spirited citizens be made to bring about a new order which will put competency and knowledge before party favor and political motives in the selection of park officials and thus assure the people and the taxpayers of conscientious and efficient management of the parks?

Improving City Layouts

Good planning for cities and closely-built towns and villages is not primarily a matter of aesthetics, but of economics. The main object is to prevent or remedy the physical and moral evils and losses which accompany congestion of population. The laying-out of most American cities has been casual and thoughtless of future needs. To improve or reform the layout of most American cities is a great public need.—*Charles W. Eliot.*

Making Emergency Asphalt Street Repairs on an Efficiency Basis

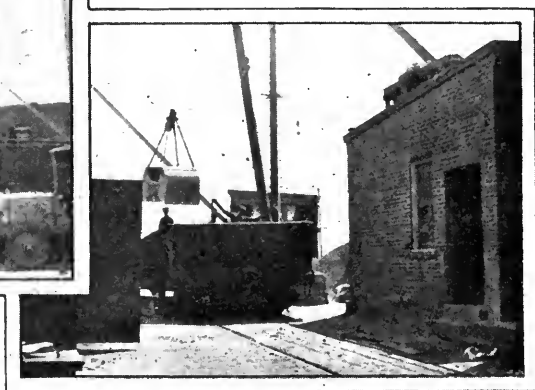
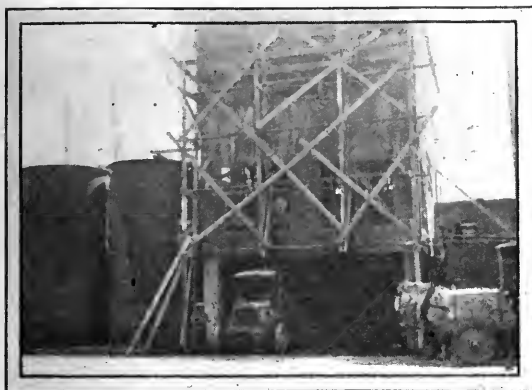
Philadelphia's Municipal Asphalt Plant Supersedes the Old, Inadequate Contract System

By K. H. Lansing

WHEN, on April 6 of the present year, the city of Philadelphia took possession of its newly finished municipal asphalt repair plant, it discontinued, probably forever, the expensive, halting and inefficient system of repairing asphalt streets under annual contract, with which it has been wrestling for years.

Bureau, under whose direction the plant has been placed, is confident that it will more than pay for itself in the first year.

It was impossible to maintain repairs effectively, so that the city's streets would be safe, under the old system whereby the work was done under one or two contracts. The successful and economical maintenance



VIEWS OF PHILADELPHIA'S NEW ASPHALT STREET REPAIR PLANT

At left is shown the corrugated steel building which houses the two mechanical mixing units. The truck is under the mixer ready to receive the asphalt discharged by gravity. To the extreme left are the foremost two of a battery of 4 asphalt storage tanks of 10,000 gallons each. In the right hand illustration is shown one of the two 80-foot booms stiff-leg derricks which is electrically operated

The plant, which cost \$115,000 to construct and \$65,000 to equip, is the largest single one of its kind in the country, except that operated in New York City. Situated on a city-owned concrete pier, the plant is easy of access by rail, barge and motor truck. Its two units have a rated capacity of 1,850 square yards each of material a day. It burns fuel oil and its machinery is electrically driven. In the brief period of its operation the plant already has shown its superiority over the old method, and Chief Frederick C. Dunlap, of the Highway

of asphalt streets, of which there are in Philadelphia upwards of 600 miles, requires that repairs be made immediately on locating serious defects in the pavement, caused by wear or accident. A hole 6 inches in diameter under the strain of modern street traffic soon grows to big proportions, and hundreds of miles of Philadelphia's thoroughfares were paved when modern motor-driven vehicles were a small factor. The average appropriations per year for a period of years for repairs to asphalt streets in Philadelphia have been close to \$325,000.

This sum was so inadequate that only a part of the work could be accomplished under it. In April, 1920, the city advertised for bids for a municipal asphalt plant calculated to have an output of approximately 4,000 square yards of finished 2-inch wearing surface and a 1-inch binding course. The specifications included two mechanical mixing units, direct hot storage capacity for a three-hour supply, and one week's cold storage supply.

The Parts of the Plant

The city accepted the quotation of the Barber Asphalt Paving Company for two of its standard 1,850-yard units, at a cost of \$46,000. These units are complete mechanical mixing units, but they provided no means of storage, nor any means of mechanically feeding the dust. For the storage of asphaltic cement four 10,000-gallon tanks were purchased for \$5,120, and heating and agitating coils were bought for \$3,040. A dust bin to hold the fine surfacing material, with a conveyor, was purchased for \$870.94.

The mechanical units furnished are the latest so-called straight-line type. The economical arrangement of these units was to place them on the first floor level, so that motor trucks might drive under the mixing boxes and the material be discharged by gravity into the trucks. The foundations were built by city forces.

The plants supplied are equipped for fuel oil burning, but no pumping set, or piping, was included. The furnace selected was made readily convertible for coal burning. For equipment, furnace and fuel oil system, contracts were let as follows:

1. Fuel oil storage tank, 13,000 gallons....	\$1,840.00
2. Hammel duplex firing set.....	871.00
3. Grate bars, bearer bars.....	466.00
4. Furnace fronts.....	499.00
5. Fire bricks and clay.....	387.50

The units are equipped with steam drive, for which the Barber Asphalt Paving Company furnished a 100-horse-power boiler, which heats the storage tanks and melting kettles only. The machinery is driven by one 125-horse-power motor with silent chain drives.

For handling sand, stone and asphaltic cement, two stiff-leg derricks costing \$2,800 each, two electric hoists at \$4,550 each, two clam-shell boxes at \$1,850, and one asphalt pump set for \$1,147 were installed.

Reservoir storage bins, a novel system for this kind of plant, were selected for feeding by gravity into the cold-material elevator boots. They were constructed with a capacity of four barges of sand and twelve barges of stone, respectively. The reservoir bins lie at the end of the pier and are uncovered.

The mechanical mixing units are of the latest pattern, straight-line Iroquois type, each with a rated capacity of 1,850 square yards a day. The mixers are of the twin-shaft, pug-mill variety, and the sand dryers have an appropriate capacity of 20 tons of material per hour. The material goes in at a temperature of 60 degrees and comes out at a temperature of 500 degrees.

There are two dust rooms in a brick building at the rear of the units, which are themselves housed in a steel building 25 x 50 feet. Each dust room has an approximate capacity of four cars of dust. One of the rooms is devoted to feeding the chain bucket conveyor, of link-belt construction. The dust is wormed from the dust bin into the weighing boxes.

The reservoir bin system is next to the feeding platform, the material being picked from the outside bins. The workmen shovel the proper amount of stone to the conveyor, and thence the material is borne to the sand dryers, which are heated by fuel oil burners. Hot sand is discharged from the dryers into the hot-sand elevator and carried up to the storage bins. The dust collectors are of the centrifugal type. After the material has been weighed out in the proportion wanted, the gates are opened and the material discharged. The asphalt is conveyed by truck to the job at a maintained temperature of 300 degrees.

The 100-horse-power boiler, burning fuel oil, is of economic type and, as it was constructed so as to be convertible to coal burning, an adequate supply of coal is kept on hand at the plant in case it should be expedient to make the change. The fuel oil tank's capacity has been enlarged to 20,000 gallons instead of the original 13,000. The oil is pumped from a Hammill pumping set to both dryer furnaces in the units.

A fleet of 5-ton and 2½-ton motor trucks is used to haul the asphalt and to move repair gangs. This equipment is housed in a large garage and machine shop, for which the Council appropriated \$70,000, across Delaware Avenue from the asphalt plant.

Both trucks and full repair equipment are available at a moment's notice.

Emergency Gangs

"Flying squadrons," or "jitney gangs," as they are called at City Hall and the asphalt plant, are sent out, after the manner of fire department details, in response to "alarms" sent in on the finding of breaks or holes in the asphalt paving anywhere in the city. There are eight of these gangs at present,

and the nearest one, with repair equipment, is rushed in a motor truck to the scene of the alarm. This "first aid to the injured" paving prevents a break or hole from becoming larger and is a great improvement on any method ever tried in Philadelphia before. Sometimes the repair may be only of a temporary nature, in which case the city's regular repair gangs supplement the work.

Conneaut, Ohio, Buys Local Private Water-Works

The History of the Water-Works Under Private Ownership and the Story of the Acquisition by the Municipality

ON May 17, 1921, Conneaut, Ohio, voted, 1,091 to 483, to purchase the property of the Conneaut Water Company. Conneaut is a city of 10,000 inhabitants, situated on Lake Erie at the mouth of the Conneaut River, two miles west of the Pennsylvania state line and approximately 70 miles east of Cleveland. Its chief industries are connected with iron ore, which is brought up on the lake, loaded into cars and hauled to the Pittsburgh furnaces. On the return trip the cars are filled with coal from Pennsylvania, loaded onto boats and taken to the upper lakes and the Northwest. For some time the city has owned its electric lighting plant, which has been successfully operated under the management of Benjamin Laubach, superintendent.

The city has been so well pleased with the electric light service and rates that the City Council passed ordinances authorizing the purchase of the Conneaut Water Company, and the election was called, with the result given above. The water-works was organized as a private company in 1890, but after about eleven years of unsuccessful operation it was sold at sheriff's sale to the Conneaut Water Company. In 1901, shortly after the organization of the new company, it was decided by the directors to improve the plant and distribution system as rapidly as the finances would permit. This resulted in the construction of the new intake and tunnel into the lake, as well as new filters, filter-house and smoke-stack, new boilers, boiler-house, sedimentation tanks, chlori-

nator, new pumps and pump-house. Of the original plant, only one small engine and two filters remain.

At the present time the plant has two 300-horse-power boilers, two high-pressure pumps (1 Laidlaw-Dunn-Gordon 2,500,000-gallon pump, and one D'Auria 3,000,000-gallon pump), two low-duty pumps, one of which is a Dean of Holyoke, 3,500,000-gallon capacity, and the other a De Laval turbine of 2,800,000 capacity. There are six filters of 700,000 gallons per day capacity each, and two sedimentation tanks 30 feet in diameter by 15 feet high, where the water is treated with sulphate of alumina before going to the filters. With the exception of the intake tunnel and the smoke-stack, all the improvements were made by day labor under the supervision of the superintendent.

When the city of Conneaut anticipated the purchase of the holdings of the Conneaut Water Company, in favor of which the Chamber of Commerce had worked for some time, the city engaged George Champe, of Toledo, Ohio, to prepare an inventory and appraisal. At the time of the inventory it was clearly shown that the plant was in an up-to-date condition; 23 miles of cast iron water-main had been laid, and 214 Eddy gate valves and 222 Eddy fire hydrants had been installed. All service connections are of galvanized iron pipe with Glauber lead flange corporation cocks. The majority of the meters are Tridents. Daily analysis records are kept of the raw and the filtered water.

Concrete Highway Bridge and Culvert Standards—Part II

State Culvert and Highway Standards Tabulated and Discussed

By A. C. Irwin

Plain Concrete Arch Culverts

THE use of plain concrete arch culverts is not nearly so prevalent as the use of reinforced-concrete slab or girder bridges having the same span. The question arises, however, as to whether this type of culvert has been given the consideration it deserves. It is true, of course, that the plain concrete arch culvert, including the abutments, requires considerably more concrete to construct than does the reinforced concrete slab or girder type. On the other hand, the former requires no reinforcing rods with the attendant cost of placing them. There is another consideration which bears upon the increasingly important matter of the excess strength for which a highway bridge should be designed. It may be idle to try to predict the increases that will take place in the loads which future highway bridges will be called upon to carry. Some students of this question believe that these increases will be equal in percentage of those that have taken place on our railroads. The very fact that a plain concrete arch is not susceptible to the accurate computation of stresses permitted in the design of the reinforced concrete slab or girder types results in the use of a very high factor of safety, which may be found exceedingly valuable to take care of large future increases in live loads.

Three types of footings are found for plain arch culverts. For small spans up to

5 feet the state of Illinois uses the bottom slab, which supports the arch without special footings. The Illinois standard also preserves a constant thickness of the arch ring and is really but a modification of the pipe culvert. The designs of all other states examined show an increase in arch ring thickness from the crown toward the springing lines. A crown thickness of 6 inches seems to be the minimum for all states except Pennsylvania, which requires an 8-inch minimum crown thickness.

In general, the standard plans do not call for waterproofing arch culverts, and weep holes are provided in those of only one state. In this connection it would seem a proper practice to carry the impervious roadway surface to gutters which would conduct the water entirely away from the space behind the abutment wings; and if U-abutments are used, the entire ground surface between ends of wings should be paved with impervious material. This would insure that no water would collect and be held in the earth fill under the roadway surface to soften the road foundation.

Construction joints are found commonly at the spring line and in some cases at the top of footing. Approximately 65 per cent of the plans examined make no provision for minimum fill above the arch ring. Either this point is left to be taken care of in specifications, or the importance of such a fill between top of arch ring and bottom

DATA ON ARCH CULVERTS

State	Span	Crown Thickness	Thick-ness at Spring Line	Loading	Footing	Type Wingwall	Location of Con-struction	Mini-mum Depth of Fill
Illinois.....	2' to 5'	6"	6"	*	{ Bottom Slab Bot. Slab to 3' span 3' footings spans 73' }	U	None	.....
Missouri.....	2' to 6'	6"	Variable	{ 15-ton truck }	{ 45° }	{ Sp. line and top of footing }		2' 0"
Pennsylvania.....	4' to 12'	8" to 11"	Variable	*	Variable	45°	{ Top of footing }	1' 0"
Virginia.....	3' to 14'	6" to 12"	Variable	*	{ Bottom of side walls }	30°	{ Spring line }	
Oklahoma.....	2' to 14'	6" to 12"	Variable	*	{ Bottom of side walls }	{ 30° up. st. straight down st. }	{ Spring line }	....

* Loading not shown on plans.

of roadway surface is not considered important.

Flaring-wing abutments are the most popular type, but by comparing the cubic yards in U-abutments and in wing abutments it is seen that the straight-wing type is most economical of material for pipe culverts, and this doubtless holds true for plain arch abutments.

Girder-Spans

A comparison of the tables for slab spans and for girder spans indicates that spans of about 20 or 25 feet are found to be more economical in the girder type than in the slab type. The state of Illinois has standard plans for girder spans of 65 feet, with the states of Wyoming and Colorado second with 50 feet. It may be worth while in passing to mention the fact that the 142-foot span recently constructed in California is claimed to have cost considerably less than arches would have cost.

Camber is given to girder spans in only three cases and in two of these this amounts to 3 inches. The writer cannot see where anything is gained by building concrete bridges with camber.

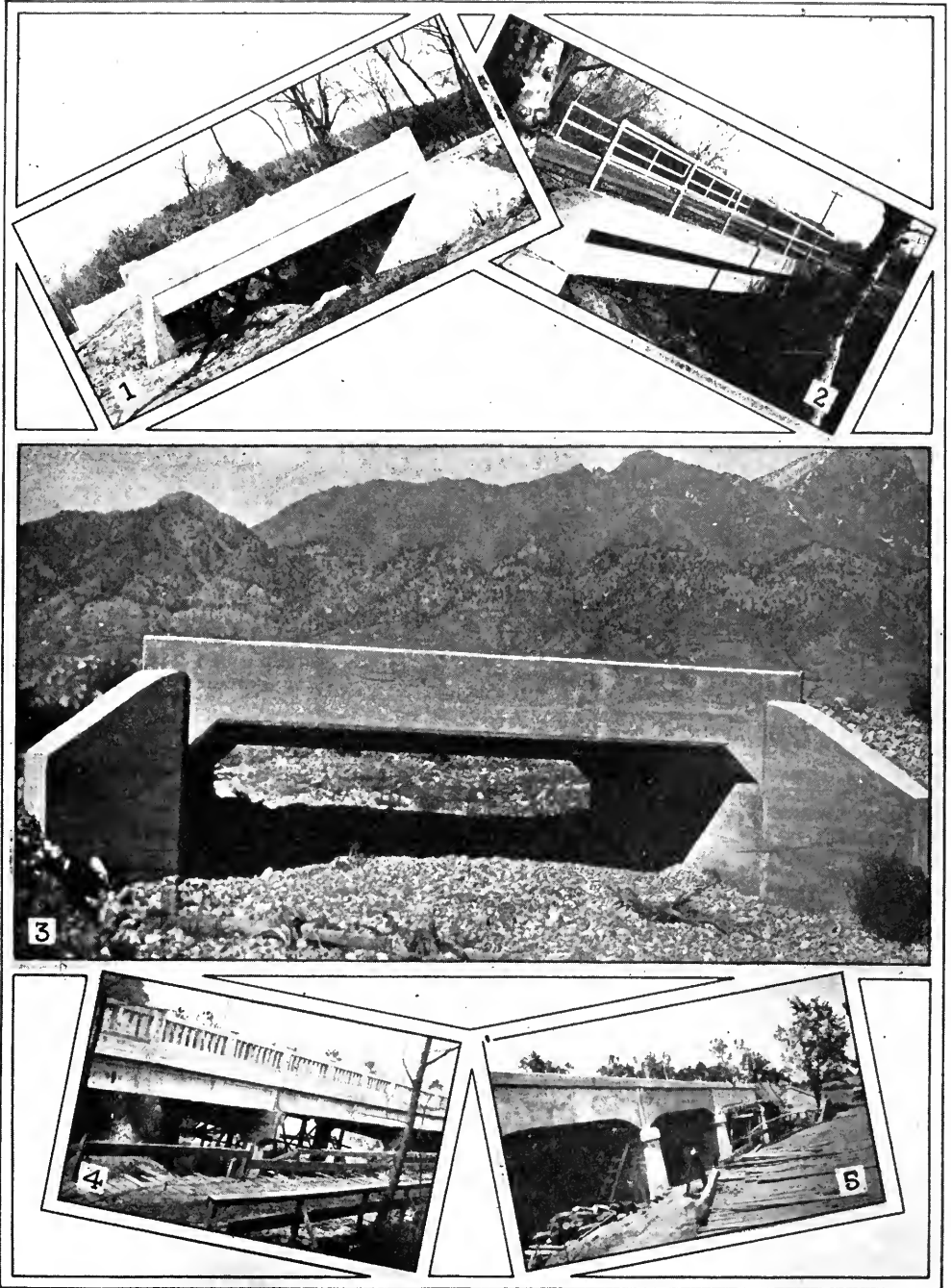
In contrast to the usual practice for slab spans, expansion joints are generally provided for the concrete girder type. For the long girder spans the Illinois standard plans provide a rocker under each girder between top and bottom steel plates to spread the end reaction over sufficient area of concrete to carry the load. However, the majority of expansion joints consist of three or four thicknesses of tar paper laid on the smoothly trowled surface of the bridge seat.

The table of girder spans shows the design loadings used by the various states and the width of roadway provided. This, of course, should agree substantially with the loadings and width of roadway required for slab spans, with the exception that for the long girder spans it would seem proper to increase the moving load over that for the shorter slab spans.

Four of the plans examined indicate the surface finish required. Two of them call for bush-hammered and two of them require rubbing. Bush-hammering is required only where the railings are paneled. While many state highway departments undoubtedly have specifications in regard to

DATA ON GIRDER SPANS

State	Span		Loading	Roadway	Type	Number of Girders
	Min.	Max.				
Alabama.....	20'	40'	{ 15-ton truck, 30 % impact and 80 lb. per sq. ft. }	18'	Deck	4
Colorado.....	16'	50'	.....	20'	Deck	6
Delaware.....	35'	—	{ 20-ton truck and 150 lb. per sq. ft. }	26'	Deck	6
Georgia.....	10'	38'	15-ton truck, 30 % impact	18'	Deck	4
Idaho.....	25'	..	20-ton engine, 25 % impact	..	Deck	4
Illinois.....	30'	65'	.....	16' to 20'	Thru	2
Indiana.....	20'	..	.....	20'	Deck	5
Maryland.....	18'	32'	18-ton truck, 15 % impact	24'	Deck	5
Mississippi.....	16'	40'	{ 15-ton truck, 30 % impact, 80 lb. per sq. ft. }	16'	Deck	4
Missouri.....	20'	48'	{ 15-ton tractor, 10-ton trailer, 20 % impact }	18'	{ Deck 20' to 40' Thru 30' to 48' }	7 Deck 2 Thru
New Mexico.....	20'	40'	.....	16'	Deck	3
North Carolina.....	{ 25'	.....	{ 15-ton truck, 30 % impact }	18'	Deck	3
Ohio.....	{ 26' 35' 25'	{ 26' 35' 35'	.....	20'	Thru	2
Oklahoma.....	28'	40'	{ 15-ton truck, 30 % impact and 80 lbs. per sq. ft. }	18'	Deck	6
Pennsylvania.....	20'	36'	.....	26'	Deck	9
South Carolina.....	20'	32'	{ 15-ton truck, 20 % impact and 150 lb. per sq. ft. }	24'	Deck	4
Vermont.....	16'	30'	15-ton truck	18' to 21'	Deck	5
Virginia.....	20'	40'	.....	18'	Thru	2
Wisconsin.....	20'	45'	.....	18' and 20'	1/2 Thru	{ 2 Deck 2 Thru }
Wyoming.....	30'	50'	.....	18'	Deck	5



TYPICAL CONCRETE GIRDER AND FLAT SLAB CULVERTS ON AMERICAN HIGHWAYS

1, Small culvert on Route 1, Pennsylvania. 2, Girder Type Bridge in New Mexico. 3, A 16-foot slab bridge on Lost River Highway, Idaho. 4, Triple 40-foot T-beam girder bridge in Alabama. 5, Hard Labor Creek bridge, McCormick County, South Carolina, where forms were being removed

surface finish, which may be made to apply as required by the location of the bridge, it seems that the appearance of a bridge that would be used on a main-line of traffic should be pleasing and that a proper place to indicate the finish would be on the standard plans. Difference in practice is indicated in regard to casting the hand-rail monolithic with the supporting girder.

The thickness of floor varies from a minimum of about 7 inches, depending upon the number of girders used, to a thickness of 16 inches required in the Illinois twin-girder design for the 65-foot span. Lack of agreement as to proper unit working stresses and load distribution is responsible for considerable variation in the quantity of material required by various designs for the same span and loading.

Design Loading

Of paramount importance at this time is the question of loading for which a highway ridge shall be designed. An examination of the tables of data on slab spans and on girder spans shows that the minimum load is a 15-ton truck with 30 per cent impact, and a maximum moving load of 20 tons with 25 per cent impact. In some cases the specified uniform load governs the design of the longer spans, but the alternate uniform loadings given for slab spans have no significance.

The moving load is usually distributed about 70 per cent on the rear axle of a 10-foot wheel base. A truck carrying a 10-ton load will itself weigh 6 or 7 tons, making a total of more than the minimum used in a majority of the standards.

If highway traffic loads continue to increase, many bridges will be carrying much more than their design loads and may have to be replaced with stronger bridges. It is a well-known fact that first class concrete grows stronger with age and that low working stresses are used in design, but there is a limit to the reserve strength thus provided, especially in the steel reinforcement, and if the prediction made by many about increases in rolling loads comes true, this limit will soon be surpassed. Laws limiting the loading of bridges are difficult to enforce and are questionable as to advisability. The extra cost of making highway bridges strong enough to carry much heavier than their present design loads would be a very small percentage of

the cost of the road itself. The value of the road may be increased much more than the small extra cost of stronger bridges, and it seems that a material increase in design loadings by a majority of the states would be advisable.

Along with the actual load specified, the matter of impact allowance is important. In view of the exhaustive experiments performed by the American Railway Engineering Association, it is hard to believe that there can be much impact on a bridge if the roadway is smooth.

Highway bridges are not subjected to the unbalanced rotating and reciprocating parts which in locomotives are the source of the major portion of impact on the main supporting members of railroad bridges. If the roadway is perfectly smooth, the effect of high speed is negligible. However, holes, ruts, loose stones, etc., which produce shocks on a bridge, may produce sensible impact effects, but the shocks will in large part be absorbed by the road surface and the mass of the bridge as a whole.

It would seem, therefore, that the usual addition to live load to take care of impact is ample and that in reality the allowance for impact increases the factor of safety and provides reserve strength for future increases in loading. It follows also that when the loads to which a bridge is subjected begin to approximate the maximum carrying capacity, the road surface should be maintained in a smooth condition.

Width of Roadway

Examination of the tables of slab and girder spans indicates a minimum specified width of roadway of 16 feet, but the majority of standards require a width of 18 feet or more.

W. G. Thompson, formerly Highway Engineer of New Jersey, recommends a minimum width of roadway of 20 feet and bases his recommendation on experience and observation of conditions in the Middle and North Atlantic States. There is no question but that the width of roadway on a bridge should at least equal the width of the paved roadway proper, and there is very good reason for making the roadway on the bridge equal to the paved width of the road plus the width of the shoulders.

Massachusetts Playgrounds Teach Safety

TWENTY-TWO Massachusetts cities are giving safety instruction on their playgrounds this summer, in an effort to cut down the toll of 66 children killed and 724 injured by motor vehicles during the vacation period of last year. The Safe Roads Federation of Massachusetts, which organized the campaign, made its first approach to the matter through the several mayors, who gave instructions to their playground supervisors to coöperate. Posters were sent out to one hundred playgrounds with the slogan, "Help win for this playground and its children a perfect record for No-Accidents during the summer." The six points stressed were:

- Don't run in front of an auto.
- Don't play in the streets where autos are passing.
- Don't chase a playmate from the sidewalk into the street.
- Don't catch on behind a motor truck.

You have read — or you will hear it read before you are much older — the story of Ben-Hur's chariot race.

Of all the great crowd that saw that race, not one tried to cross the course while the chariots were speeding on their way. Even the children of that day had been taught the danger of running in front of those swift, low-wheeled cars.

The modern automobile, with its low, far spread wheels, is the great-grandchild of the ancient chariot.

But the slowest auto in Massachusetts today is faster than Ben-Hur's Chariot.

And there are a hundred times more autos on many city highways than there were chariots upon the race course.

These modern chariots killed 180 children and injured 2300 others in Massachusetts in 1920. The drivers of the autos were not entirely to blame!

Causes of Accidents

The Safe Roads Federation of Massachusetts wanted to know who was to blame. So it made a study of the causes of the accidents, and it learned these things:

Half the accidents happened because a child darted in front of a moving auto.

Many children were struck while running across the street where there was no crossing.

Many boys were killed while stealing a ride on an auto truck, or catching hold of one while riding on a bicycle.

Riding on the running board of an auto, rolling hoop, or playing tag in the street caused many accidents.

Value of Human Life

Value of a boy's or girl's life measured in money.

Parents spend hundreds of dollars to feed and clothe their children, so that they may grow to be useful citizens.

State and city spend thousands of dollars for their education.

Their value is also measured in their suffering, and in the sorrow of their

Don't take hold of an auto while riding a bicycle.

Don't run out from behind a standing auto, street car or ice cart.

A series of lesson leaflets, based on the accident records of the previous six months, was supplied to the supervisors, and a new game called "Traffic," based upon the equal rights of motor vehicles and pedestrians in the highways, was added to the list of playground sports.

This playground campaign aroused much interest in the press, and many offers of assistance were received. One volunteer story-teller was an elderly man who had lost a leg when 11 years old through his own carelessness at railroad crossing.

The Safe Roads Federation, which made a beginning in public school instruction in highway safety by sending 110,000 lesson leaflets into the schools during the spring,

Let us make 1921 a safe year for the children.

fathers and mothers when they are brought home maimed or dead.

That is why the Safe Roads Federation, and the Massachusetts Department of Education, ask the pupils of the state to aid them in making 1921 a safe year for children.

How You Can Help

Here are ten new Commandments to be learned and obeyed.

Never run in front of a moving automobile.

When crossing the street be sure the way is clear. Look first to the left and then to the right.

Do not play games in a street where autos are passing.

When you chase a playmate or a ball into the street keep the autos in mind.

If a country road has no sidewalks walk on the left side after sundown, so that no autos will come upon you from behind.

You risk your life when you steal a ride on a motor truck, or when you drop from one.

Do not run into the street from behind standing autos, street cars or wagons, because your view is cut off when you do so.

Do not hold up autos after school and ask for a ride.

Look upon the traffic officer as your friend, and watch his signals until you understand what they mean.

Cut out the auto accidents reported in the newspapers each day, and explain them to younger children.

If you saved another child from death you would become a hero.

Save your own life and limb, so that you may become a good citizen of Massachusetts.

Electric Rates and Rate-Making—Part II

A Practical Discussion Prepared Especially for Municipal Officials

By Charles M. Fassett

SCIENTIFIC rate-making is a new art. The good old practice of charging "all that the traffic will bear" is gradually being displaced by the effort to assess the total earnings required to the various classes of consumers on a basis of equity and justice. But there still remains the necessity for expediency in the nice adjustment between a rate of universal application and one elastic enough to encourage the fullest use of the plant and thereby make its product cheaper to all users. An ideal rate would be one which covered fixed expenditures by a service charge against every consumer, based upon the approximate amount of his usage and the cost of carrying his individual account, and sufficient to cover, in its total proceeds, those costs which are independent of the amount of production. The cost of current would then be added according to usage, and could be uniform to all consumers, and very low. There is now a tendency toward this sort of rate in the telephone and gas utilities. The chief objection to it is that it puts a heavier burden on the small consumer, and it is to the public interest to encourage his patronage, even though his service produces no profit. We can better afford to pay a little higher rate than to debar the humble citizen from the use of electricity.

Most electric utility companies, with the approval of public officials and commissions, now have separate rate schedules, each covering specific uses, such as residential lighting, commercial lighting, small power, large power, illuminated signs, heating and cooking, street lighting, street railways, etc., all with different charges, each of which contains a fixed minimum which must be paid regardless of a less amount of usage it covers at the rate specified. In all these classes the rate is a series of steps downward, as the quantity of current used increases. The different price for different usages and the stepped rates for a product that costs just the same, can only be justified by the less expense of wholesale sales, and the advantage to all of

more extended production or better load factors. Common practice demonstrates the approval of these arguments.

Domestic Use.—Electricity for residence lighting brings the top price, and the schedules differ in nearly every city. Here is the rate card for Newport, R. I., which has one of the highest rates in the country, and the utility is now asking a twenty per cent increase. The schedule applies to both residence and commercial lighting:

First 100 kw.-hrs. monthly, 14 cents per kw.-hr.
Next 400 kw.-hrs. monthly, 12 cents per kw.-hr.
All over 500 kw.-hrs. monthly, 10½ cents per kw.-hr.
Discount of 10 per cent for prompt payment
Minimum charge of \$1.00 per month to residences
Minimum charge of \$2.00 per month to stores, etc.

This rate is commendable only for its simplicity; the price is extreme, and the drop gives no relief to the ordinary domestic consumer. Few dwellings of five to seven rooms would require fifteen lamps, 25 watts each, burning an average of three hours per night, each night in the month, and yet the consumer would have to use three times this much light before he would benefit from the drop in rate in Newport, and the use of electric household appliances and ranges would be prohibited. Downward steps in domestic rates are practically useless, either in cost reduction to the consumer or as encouragement toward a better load factor for the company, when they do not step down earlier than 100 kw. hr. per month.

Here is the schedule of the municipal plant of Pasadena, Calif., applicable to all uses of incandescent lighting:

First 100 kw.-hrs., monthly, 5 cents per kw.-hr.
Next 400 kw.-hrs., monthly, 4½ cents per kw.-hr.
Next 500 kw.-hrs., monthly, 4 cents per kw.-hr.
Next 1,000 kw.-hrs., monthly, 3½ cents per kw.-hr.
Over 2,000 kw.-hrs., monthly, 3 cents per kw.-hr.
Monthly minimum charge 50 cents per meter of 3 kw. capacity plus 30 cents for each additional kw. meter capacity.

This schedule is simple and, considering the present price paid for coal, \$9.79 per ton, the rates are low, but the step benefits only the commercial user. Pasadena makes a 4-cent rate for heating, cooking, etc., requiring a separate meter and separate wiring for these uses.

Following is the residential rate for Spokane, Wash., a privately owned hydro-electric plant:

For the first 20 kw.-hrs. per month, 7 cents per kw.-hr.
 For all over 20 kw.-hrs. per month, 3 cents per kw.-hr.
 Minimum bill 70 cents per month

This rate is low and simple, and has its step-down where it benefits the ordinary consumer, and enough of a step to encourage the use of electricity by every household. Since it was fixed, there have been over 3,000 electric ranges installed on the company's lines, and all sorts of electrical household appliances are freely used.

The municipal plant of Cleveland, Ohio, has a rate schedule which applies to all users of current, for every purpose, excepting "temporary, special or irregular service." It is beyond the comprehension of any layman and most engineers, but its saving grace is the fact that the top rate which anybody pays is 3 cents per kw.-hr., and that only one rate schedule is needed. Coal cost them \$6.24 per ton in August, 1920. Here is a part of the Cleveland schedule:

"For all consumption of 1,225 units or less per month the rate will be 3 cents per kw. hour, except when minimum rate applies. For consumption of more than 1,225 units per month the rate will be determined from the accompanying rate schedule except when minimum rate applies. These rates will be based upon the capacity of the service determined as follows: viz., the average of each week's maximum one hour kv.-amp. demand over a period of one month," etc., etc., and so on to a kv.-amp. demand of 3,000. Minimum charge from 60 cents to \$1.25 per kw.

SCHEDULE OF RATES FOR MONTHLY CONSUMPTION

Kv.-Amp. Demand	First Units @ 3c.	Next Units @ 2c.	Balance @ 1c.
1-10.....	1,225	1,225	
15.....	1,638	1,638	
20.....	2,015	2,015	
25.....	2,350	2,350	
30.....	2,588	2,588	
35.....	3,000	3,000	

Enough rate schedules have been given to show the simple and the complex. Rate curiosities are common, one city at least measuring the cubic contents of the rooms to be lighted and charging six cents per kw.-hr. for enough current to light them adequately, with a large drop for further use for heating, cooking, etc. The theory of a heavy drop after a residence is properly lighted seems a sound one. The overhead and operating expenses and the accounting

and office costs of the account are covered in the lighting of the house, and for any further usage which can be stimulated on the premises current can be profitably furnished at a small advance over operating cost.

The National Electric Light Association, 29 West 39th Street, New York City, issues a rate book which gives the rates, of private electric companies only, in most cities of over 25,000 population in this country, and an explanation of the various schemes in general use by the companies in rate-making, such as the "step meter rate," the "block meter rate," the "flat demand rate," the "Wright demand rate," the "Block Hopkinson demand rate," the "Doherty rate," and their many modifications.

Commercial Lighting. The lighting of stores and offices, particularly in cities where most business activities cease at five or six o'clock in the afternoon, makes a load upon the electric plant which involves a large demand and a short usage, and which comes closely upon the peak of the other uses of the service. For these reasons the kw.-hr. rate should be not less than for residences, which use less current but afford a more continuous load. Like conditions prevail in hotel and lodging-house lighting. When the rooms are all occupied, the load is comparable with that of residences, but if a large proportion of them are vacant, there is a factor of "readiness to serve" which calls for a considerable amount of unused capacity in the plant, and involves an expense for fixed charges even though no current is being supplied. An electric plant is like a bank, in that it is always subject to a run which will exhaust its resources. It cannot survive if every customer calls upon it for the full capacity of all his outlets at the same time.

The modern dwelling of seven rooms will have about 25 light outlets, besides outlets for various household appliances. With a 25-watt lamp burning in each outlet its consumption will be 625 watts for lighting alone, but its demand at any one time is not likely to be over 200 watts. Multiply the unused capacity of this house by the number of houses in the city and we get an idea of the enormous possible demand in residence lighting, which condition is even more acute in some forms of the commercial lighting load. It is a common fallacy to

argue that every kw.-hr. of electric current costs the same no matter what it is used for. Electricity cannot be economically stored, overhead expenses cover reserve capacity as well as that in use, and the overhead is often the largest factor in the total costs of operation. This will be seen more clearly in considering certain "stand-by" power loads.

Of course the safety in operation depends upon the fact that all patrons are not going to call on the plant for their full capacity of use at the same time, but all these conditions affect the load factor of the plant, and thus affect the relation of costs to earnings, which must be reflected ultimately in the rates. Sign lighting is often furnished at a flat rate, with switches turned off and on by company patrols or automatic time switches.

Power.—The ideal power load, and the one entitled to the lowest rate from the plant supplying both light and power for general use, is the one which uses current off the lighting peak, but few industries are able to comply with this condition. Next to it in desirability is the load which is fairly stable and continuous throughout the 24 hours of the day. Other conditions being equal, the common practice is to give the larger consumers the lower rate, and this is often done by making power rates uniform and giving progressive discounts on the larger quantities of current used. This does not fit cases of intermittent use, such as "stand-by" service. Of the latter there are many varieties, but one illustration will suffice for our present purpose.

A municipal water-works in a hilly city pumps from wells into the distributing system at pressures of 100 pounds and 165 pounds per square inch. Twenty million gallons per day is the top requirement during eight months of the year, but in the summer much water is used for lawn and street sprinkling, and the demand on a hot day in August may reach fifty million gallons. The city owns a water-power which suffices for its pumpage in the cooler months, but in the summer the flow of water at the plant is not sufficient to operate all the turbines, the demand for water increases, and outside sources of power must be called upon. In order to supply this summer demand, and to safeguard the city's water-supply in case of any accident

to its water-power plant, the city has built a pumping plant of fifty million gallons daily capacity, consisting of eight centrifugal pumps directly connected with four 900-horse-power electric motors, taking current from the private electrical utility which serves the city.

The company stands ready to supply the city the power necessary to run all these pumps at a few minutes' notice, night or day, the year around, but it normally furnishes current to run one or possibly two of them, for a few months in the year. The rate is a monthly "readiness to serve" charge throughout the year, based on the actual demand for a normal previous year, with an additional kilowatt-hour charge for current actually used in the summer. Such usage of electric current may well be classed, as in Cleveland, as "temporary, special or irregular service." Each such service is different from any other and can be cared for by a separate contract.

Power rate schedules are usually separate from lighting schedules, and are sometimes subdivided according to classes of usages. The power rates at Newport, R. I., are:

First 200 kws., monthly, 12½ cents per kw.
 Next 500 kws., monthly, 7½ cents per kw.
 Next 2,000 kws., monthly, 3¾ cents per kw.
 All over 2,700 kws., monthly, 3 cents per kw.
 Discount of 10 per cent for prompt payment. Minimum charge of \$2.50 per month. An additional charge of 1½ mills per kw.-hr. for each dollar of increase in the average cost of coal above \$4.00 per ton.

In Cleveland the power rate is the same as the lighting rate, with a top price of 3 cents per kw.-hr., a minimum depending upon the actual maximum demand as measured by the city, the amount of current at the three rates of 3, 2 and 1 cent per kw.-hr. depending upon the demand factor.

The Pasadena power rate is stepped like the lighting rate, but the prices are lower, as follows:

First 100 kw.-hrs., monthly, 4 cents per kw.-hr.
 Next 400 kw.-hrs., monthly, 2.4 cents per kw.-hr.
 Next 1,000 kw.-hrs., monthly, 2 cents per kw.-hr.
 Next 500 kw.-hrs., monthly, 1.9 cents per kw.-hr.
 Next 1,000 kw.-hrs., monthly, 1.8 cents per kw.-hr.
 All over 3,000 kw.-hrs., monthly, 1.2 cents per kw.-hr.
 Minimum charge of \$1.00 per month per meter of 1½ kilowatt capacity or less, and 75 cents for each additional kilowatt of meter capacity required.

The Spokane general power rate is \$3.15 per kv.-amp. of demand, which includes 100 hours' use of demand per month, plus an energy charge, for consumption in excess of that included in above, 1 cent per kw.-hr.

Users of large quantities of bulk power

for which they are willing to contract for long terms can usually obtain specially low rates, particularly if the electric plant is developed ahead of normal demand. A rate of \$25 per horse-power per year is not unknown, and this amounts to about 2.2 mills per kw.-hr for continuous use of total power.

Street Lighting.—Rates for general street lighting are usually a matter of contract between the city and the utility, and the cost usually comes out of the general tax funds of the city. Ornamental curb lights on business streets are often paid for by voluntary subscription or by a frontage assessment against abutting property. Seattle pays its municipal plant $4\frac{1}{2}$ cents per kilowatt hour for all current used in street lighting, and out of this the utility installs, maintains and operates curb lights in the business district and intersection lights in residence districts. San Francisco installed a beautiful curb lighting system on Market Street, financed by voluntary subscriptions, but made the mistake of doing it under a three-year contract, which expired last year. Chicago has installed many thousands of curb lights, using gas-filled Mazda lamps of 600 candle-power on ornamental posts, the current for which is furnished by the publicly owned power plant of the Chicago Drainage Canal.

In Spokane curb lighting is furnished under ten-year contracts which provide for installation and operation by the private utility company, the city paying one-fourth the total cost, and the owners of the street frontage three-fourths. At the end of the ten years the equipment becomes the property of the city. No street is lighted in this way unless owners of two-thirds of the property abutting the district to be lighted petition the City Council for the improvement. The ornamental posts are spaced approximately one hundred feet apart, on both sides of the street, with four at each intersection. The lamps are General Elec-

tric magnetic arcs, 6.6 amperes each, with opal glass shades, lighted all night, every night. The cost to the frontage owners varies from \$2.00 to \$2.50 per month for each fifty feet of street frontage.

Contracts for street lighting, particularly those which provide for new installation and equipment, should be made for at least ten years; shorter periods involve higher rates because the cost of equipment must be absorbed in the rate. If thought necessary or desirable, the contract may allow cancellation by the city before its expiration, by the payment to the utility of that portion of the cost of equipment not already absorbed by the depreciation reserve.

Street Railway.—Many private electric utility corporations operate street and suburban railways in addition to their light and power business. The city official is not concerned in the rate charged, excepting that he should see to it that the railways bear their fair share of the operating and general expenses of the company, and that no part of their burden is placed on the shoulders of the light and power consumers. The street railway business is in a pretty bad way all over the country, but it must stand or fall as a business entity, and not as a leaner upon a profitable light and power utility.

Bills

Electric meters should be read monthly on or near the same day of each month, and each bill should show present and last previous readings, the subtraction, and the rate, as well as the amount due. The bill should have printed on its back the rate applying to its class of consumer, with plain instructions for reading the meter dial and figuring the rate therefrom. Both the utility and the consumer are benefited by bills and rates which can be understood and checked by people of average intelligence and education. No electrical utility of considerable size can afford to do without a modern billing machine.

To improve or reform the layout of most American cities is a great public need, not only for beauty's sake, but for the sake of the health, efficiency and happiness of their people.—*Charles W. Eliot.*

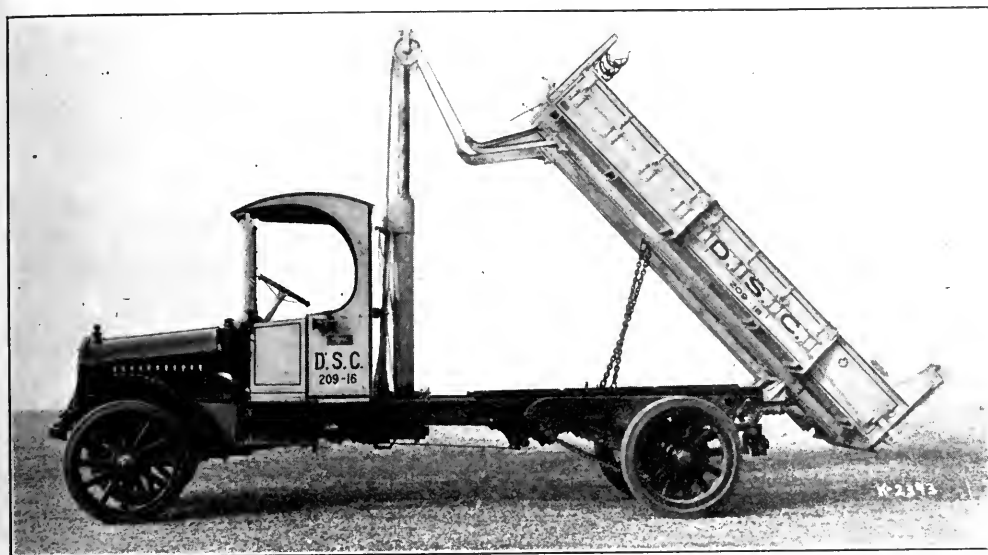
Motorized Municipal Departments



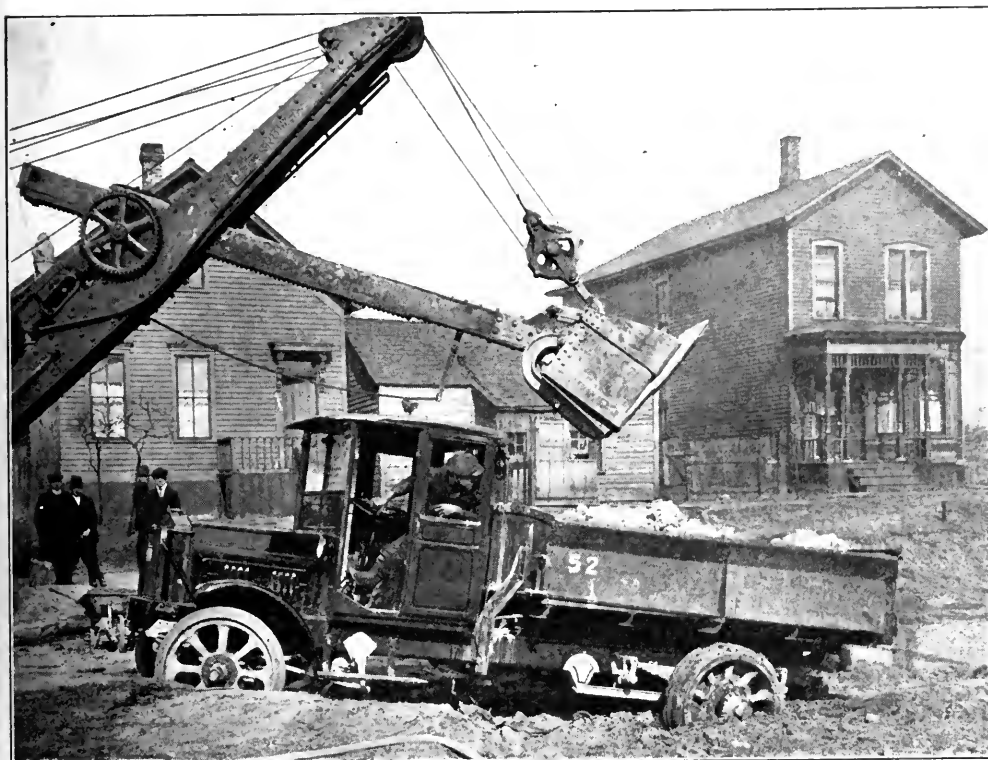
A PORTION OF NEW YORK'S 1921 STREET CLEANING PARADE, SHOWING PART OF THE FLEET OF WHITE TRUCKS EQUIPPED WITH "SOUTH BEND" FLUSHERS



TYPES OF HARLEY-DAVIDSON MOTORCYCLES USED BY THE EFFICIENT POLICE DEPARTMENT OF AMSTERDAM, HOLLAND



ONE HUNDRED 2-TON MACK TRUCKS OF THIS TYPE ARE USED BY THE DEPARTMENT OF STREET CLEANING OF NEW YORK CITY FOR THE COLLECTION OF ASHES, GARBAGE AND SNOW. A NUMBER OF OTHER CITIES, REALIZING THE EFFICIENCY OF THIS TYPE, HAVE STANDARDIZED ON IT



A FEDERAL PULLING OUT OF A BAD SPOT ON A CITY STREET AFTER RECEIVING ITS LOAD FROM THIS ERIE STEAM SHOVEL

Selling Health By Window Exhibits

By James A. Tobey

OF all the measures for health publicity, probably one of the most effective is the window exhibit. Merchants find it worth while to display their wares in this manner, and such selling methods are equally appropriate for public health. An attractively gotten-up window exhibit is sure to invite attention, and if skillfully arranged will convey the gospel of good health to the man in the street more effectively than any other message.

Publicity to draw attention to it is always worth while, though as an attraction it should stand on its own merits.

The type of material used may consist of pictures, photographs, posters, placards, charts, diagrams, models and illustrative and demonstrative articles, such as milk pails, tooth-brushes, bandages, sputum cups, drugs, mosquito larvae, fly-traps, foods, first aid kits, birth certificate, microscope, or other appropriate things. Such



A FORCEFUL EXAMPLE OF SELLING HEALTH BY WINDOW EXHIBITS

Such health displays should logically be conducted under the auspices of the local health department. The accompanying illustration shows how a progressive health officer utilizes his window space. Sometimes a private health agency may appropriately carry on such exhibits. The illustration shows an exhibit on milk sanitation in a Red Cross health center. Accuracy as to technical details is essential, no matter under whose auspices the exhibits are produced. Sensationalism should be avoided, but the exhibits should have a popular appeal. The window selected ought to be on a main street where many people

material may be obtained from the government, state, or local health departments, national, state or local private health agencies, local medical, dental, engineering, or civic associations, schools, factories, merchants, industrial concerns, or Red Cross chapters.

Each exhibit may be shown for any length of time, but a week is a suitable period. The same subject may extend over several weeks, and the material be changed every week. In this way, people get into the habit of expecting a periodic change and make a point of stopping at regular times to see what is in the window.

The arrangement of the material in the window is important. The effect is always more striking if there are only a few carefully selected things. Thus it is easy for the spectator to grasp the meaning of the display; and he is not required to study the exhibit laboriously, a thing which most people will not do, anyway. A single white motto on a colored background will make a deeper and more lasting impression than a whole window of placards each covered with small type. The exhibit shown, which was used in a Red Cross health center, is an illustration of a well-balanced display.

It is good business to advertise health. We can learn much from the commercial organizations, with regard to technique. Certainly they have no more available thing to sell to the public than does the health official. The function of the modern health officer is not only to control disease, but to prevent it. If the people know the essentials of sanitary science, this task is made easier. Education of the public in health is one of the duties of our health departments, and the window display is one of the best methods of advancing such education.

The Extent of Federal Aid Road Mileage Completed and Under Construction

U. S. Bureau of Public Roads Not Partial to Any One Type of Road

ON March 1, 1921, 22,030 miles of Federal Aid roads extending into every state had been completed or were in process of construction, at a total estimated cost of \$361,946,868. The percentage of this total estimated cost which will be incurred for each type and the mileage of each type based upon the records of plans approved, are as follows:

	Percentage of Total Estimated	Mileage
Type 1, including earth, sand, clay and gravel.....	32.2	15,300
Type 2, including waterbound and bituminous macadam...	9.0	1,530
Type 3, including brick, bituminous concrete, Portland cement concrete	48.8	4,890
Miscellaneous	4.0	310
Bridges	6.0	.....
	100.0	22,030

The states initiate the road projects, but before Federal Aid is granted, an engineer of the Federal Bureau of Public Roads makes an inspection of the roads to be improved, studies the local conditions, and consults with the state highway department, and no projects are approved which are not considered suited to the conditions to be met. Many popular fallacies exist as to road improvement, and there have been many misconceptions as to the types of roads on which Federal Aid funds may be used. Properly built earth roads are the fundamental requirement in all highway improvement. Regardless of the material or type of surfacing which is to be placed,

the preparation of the road-bed requires the highest engineering skill and experience. The Bureau considers that the use of adequate sums for the securing of proper location, thorough drainage, permanent bridges and culverts, and the elimination of rail-road crossings, is demanded if enduring improvements are to result.

Federal Aid is allotted to the improvement of earth roads, but only with the stipulation that a suitable surfacing will be placed as soon as funds become available. This allows the road-bed to be prepared and become thoroughly consolidated before the surfacing is placed, which is highly desirable from a construction view-point. To follow such a course, however, is out of the question when a road is heavily traveled and some form of surfacing must be provided. To care for traffic under these conditions, frequently a sand-clay or gravel surfacing is provided, which will serve for several years and yet allow the road to be maintained under reasonably heavy traffic. Granting that the preparation of the road-bed has been properly done, many kinds of road surfaces will give excellent service. The element of time is important. There are so many miles of roads to be constructed, and their cost will be so enormous, that the most careful and detailed study of each road project must be made, to provide, at the lowest possible cost, roads which will give satisfactory service and which

can be maintained without undue depreciation under the traffic which is to use them. Many times the question has been asked the Bureau: What type of road is best? The answer is always the same: There is no one best kind or type of road surface.

A recent statement issued by the officials of the Bureau expresses this thought in the following language:

"It is the policy of this Bureau to consider the conditions on each individual Federal Aid project, as there are elements such as subgrade, drainage and present and prospective traffic which vitally affect the determination of the standards of construction to be used."

That is, there must be a careful analysis both of the engineering and the economic conditions for each particular case, to determine the kinds of materials that can be used successfully, and after these facts are determined, then the various types of construction which can be used economically should be brought into competition to secure the best possible results. There have

been occasional attempts to write into state laws or the governing conditions of bond issues a requirement as to the type or kind of roads to be constructed. To follow such a course would be most unfortunate. The cost must always be considered in determining the type of road surfaces which are selected, and the allowable cost must be determined by the traffic which is to be borne. Local conditions vary to such an extent that very careful consideration must be given each project before determining the character or type of roads to be built. This principle was recently expressed to a chamber of commerce asking for information, in the following language:

"Types of highways should not be specified by law. This is a matter to be decided by the state highway department, in which should be lodged full authority both to construct and to maintain. Competition between different types of material should be maintained and selection made to fit traffic requirements in each case. The Bureau does not recommend any one type to exclusion of others."

Linking Small Water-Power Developments

By R. S. Payne

Civil Engineer, Waynesboro, Pa.

THE development of water-power for the smaller streams of the United States should be of interest to communities, particularly the smaller municipalities. Many of the smaller streams, if properly handled, will furnish sufficient

power for a small estate, but there are also other streams which will operate a community plant, furnishing power for pumping water, electric lighting, and running a reasonable amount of electrical machinery.

Through the combination of several of these small developments into a central plant, sufficient power can be gained to furnish light for cities of from 10,000 to 20,000 people or to furnish power for machine shops and other manufacturing establishments. The accompanying sketch gives an idea of a method of combining several such small developments into a central plant. In many instances properly constructed storage dams can be made to materially add to the power obtained by holding back the flood waters of spring for summer use.

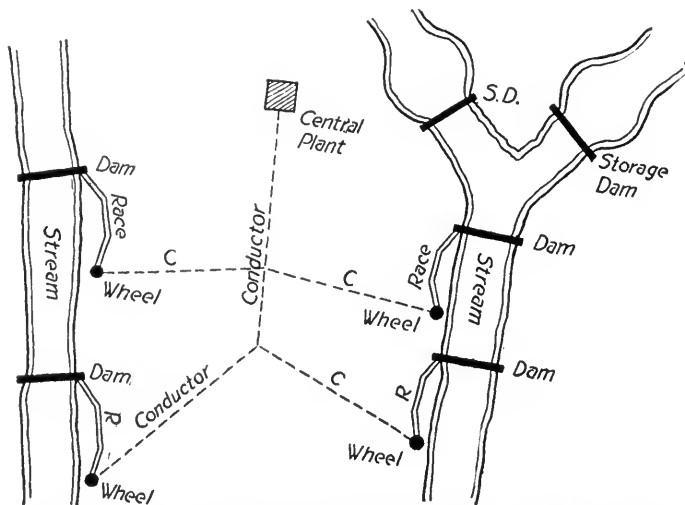


DIAGRAM SHOWING POSSIBILITIES OF TYING UP SMALL HYDRO-ELECTRIC DEVELOPMENTS

Steam Boilers and Water Softeners for Municipal Power-Plants—Part II

By W. F. Schaphorst, M. E.

Size and Number of Boiler Units

IT is impossible to make hard-and-fast recommendations regarding the sizes and number of boilers that should be installed in any given municipal power-plant. The usual practice is to install boilers in as large units as possible, at the same time giving due consideration to load fluctuations and the number of spare units that will be necessary or that should be provided.

In deciding on the size of boiler necessary, the steam consumption of the prime movers must be known. This is best obtained from the manufacturers of the prime mover that has been selected. To the steam consumption of the prime movers must be added the steam consumption of the auxiliaries, which usually varies from 15 to 20 per cent of the steam consumption of the prime movers.

After knowing the total steam consumption, the number and size of boiler units can be decided. If the load is absolutely constant, or if the load is fluctuating, it is evident that the number and size of units is of much moment. Then, it should be remembered that there must be at least one spare unit, so that other units can be cleaned without shutting down or interfering with the operation of the plant. For very large plants two spare units are the rule, while for the smaller municipal plants one spare boiler will usually suffice.

If the plant is large, it is usually best to install large units, as already stated, because large units are most efficient. The greater the size of the unit, the less the first cost, the less the labor cost, the less the first cost of brick work, the cost of piping, etc. If feed water is bad, though, large units are not advisable.

Boilers claimed to be the largest in the world were recently installed in the plant of the Ford Motor Company, Detroit, Mich. Under maximum firing conditions it is expected to produce the enormous capacity of 10,000 h.p. per unit. A combination of

powdered coal and blast furnace gas is used for fuel.

When selecting a boiler, be sure to inform the manufacturer regarding the kind of fuel that will be burned under the boiler. A boiler that will develop high efficiency with one fuel will not necessarily develop an equally high efficiency with a different fuel. Also inform the manufacturer regarding the kind of water that will be used for boiler feed, so that you will be protected against the possibility of priming, foaming, or scale formation.

In order to set the boiler properly within the right kind of setting, the safest procedure is to use the standard specifications for the setting of boilers as written by the Commercial Committee of the American Boiler Manufacturers' Association. These specifications cover both water tube boilers and return tubular boilers.

The Quality of Boiler Feed

Most water that is used for boiler feed is contaminated, unless it is rain or distilled water. Rain water as it falls to the earth is pure, but as soon as it touches the earth it begins absorbing impurities, and by the time it reaches the boiler it is more or less contaminated. As this water is then boiled out in the form of steam, the solid or organic matter is left behind in the form of scale or in the form of mud, which either adheres to the boiler shell or moves to the bottom in the form of slush. From this scale or mud much trouble is usually experienced. Some of the impurities cause corrosion, or priming.

Among the impurities found in boiler feed are acids and gases in solution, greases, vegetable matter, carbonate of soda, sulphate of magnesium, chloride, sulphate of lime, ordinary mud, salts, magnesia, bicarbonates of lime, etc.

Of course there is no cure-all for impure boiler feed. Before treating water it should be analyzed in a chemical laboratory, or it can be tested in accordance with simple test



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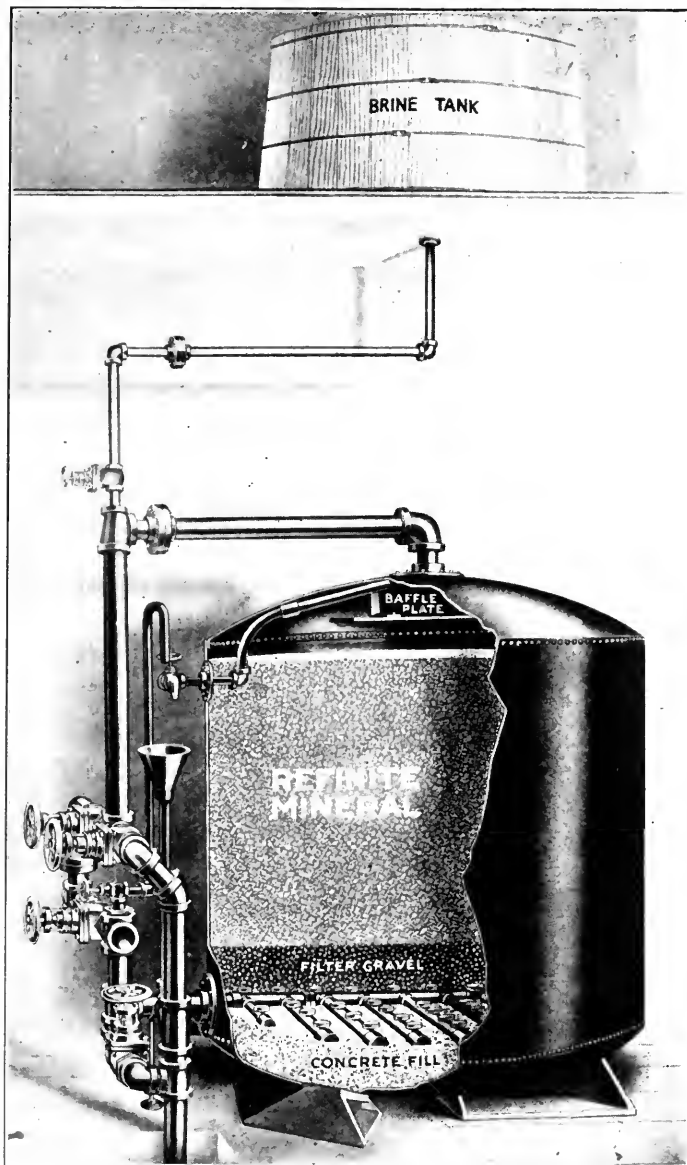
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methods. These simple tests can be carried out in any boiler room. The cost of apparatus for making such tests is not great.

There are as many different methods of removing these impurities or overcoming their effects as there are impurities. In some cases the feed water is heated. Air is kept from the feed. The water is filtered. Zeolite is used. Iron alum is added. Alkali is added. Slacked lime or soda is added. Settling tanks are used. Barium carbonate is added. Soda, carbonate of soda, barium carbonate, lime, are all added. Or the boiler is simply blown down. In general, though, water is treated in three different ways:

- 1, Chemically. This involves the use of chemicals, the well-known boiler compounds, combination of heat treatment and chemical treatment, the zeolite process, etc.
2. The thermal method. As the name implies, this method involves the applying of heat to precipitate the scale
- 3, Mechanically. Settling basins and filters are used to remove mud and suspended matter. Filter beds are usually made of such materials as excelsior, coke, sand or crushed stone

One should be cautious about the use of chemicals. It is better to use no chemicals at all than to use a chemical that might harm the boiler. It is claimed by one authority, for instance, that the constant use of carbonate of soda, in too large quantities, causes the boiler steel to become brittle. Carbonate of soda, if used at all, should be used intelligently.



APPARATUS FOR SOFTENING BOILER FEED WATER BY THE ARTIFICIAL ZEOLITE METHOD

Most so-called "boiler compounds" contain a large percentage of carbonate of soda. Sometimes caustic soda is added, sometimes phosphate of soda, sometimes materials containing tannin or starch.

A water-softening process that has gained broad recognition is the so-called "zeolite process," in which a material composed largely of sodium compounds is the softening agent. The impure boiler feed

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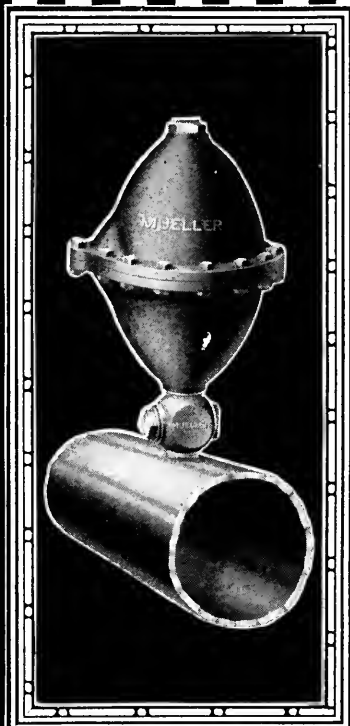
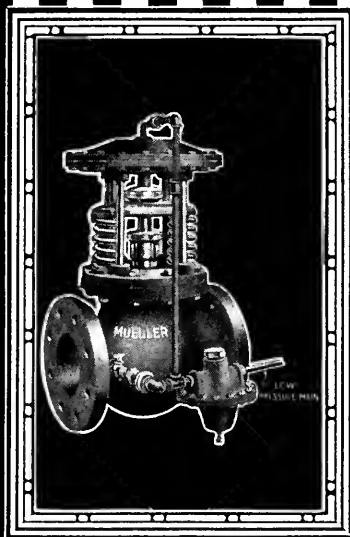
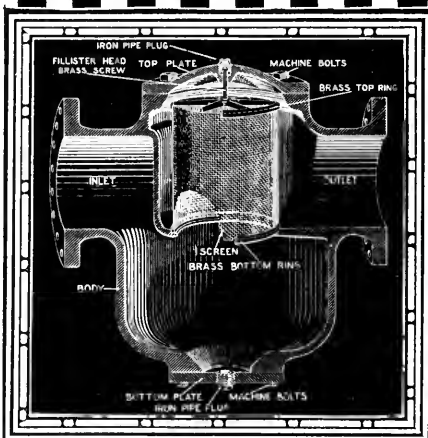
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water simply dissolves the sodium compounds from the softener and replaces it by leaving the calcium and magnesium which had caused the hardness of the water.

The principle of operation is the same as that of an ordinary filter. The only difference is that the sand is replaced by a bed of zeolite. The water simply filters down through the zeolite slowly and flows from the bottom of the tank as soft water. The entire operation is under pressure. After the water has exchanged all of the sodium held by the zeolite, the softener must be regenerated by allowing a salt solution to cover the zeolite bed. This restores the zeolite to its original composition and usefulness. The size of a zeolite softener depends upon the hardness of the water to be treated, as well as the capacity.

Where conditions require it, a modified form of zeolite process is used. One modified form is called the lime-zeolite process. It all depends upon the impurities contained in the boiler feed.

Nobody has ever disputed the fact that scale is a bad thing in a boiler—that it is and has been the cause of much money loss. Scale is bound to form in all boilers into which impure water is admitted. The ac-

tual money loss due to a definite thickness of scale is a variable quantity, however. Much depends upon the "kind" of scale—whether carbonate, sulphate, hard, soft, etc.

Many rules have been advanced for computing the money loss due to scale, based upon the thickness of the scale. Not one, however, is accurate. They cannot be accurate, because no two boiler scales are ever exactly alike. The most used rule, which is probably as good as any, is given in Sames' Mechanical Engineering Handbook, as follows:

"Scale of 1/16-inch thickness will reduce boiler efficiency 1/8, and the reduction of efficiency increases as the square of the thickness of scale."

Using this rule, for example, if \$8,000 a year is spent for coal, \$1,000 per year is lost because of scale 1/16-inch thick. Scale should be eliminated entirely, if possible, or removed frequently. Even thin coatings of scale cause serious losses.

A more accurate table has been prepared by Professor Schmidt of the University of Illinois, in which he shows that loss of efficiency depends not alone upon the thickness of the scale, but also upon its composition. The following is Professor Schmidt's table:

Character of Scale		Thickness Inch	Composition		Loss of Efficiency Per Cent
Hard	.....	1/50	Mostly	carbonate.....	9
Soft	.....	1/32	Mostly	carbonate.....	7
Hard	.....	1/32	Mostly	carbonate.....	8
Soft	.....	1/25	Mostly	carbonate.....	8
Hard	.....	1/25	Mostly	sulphate.....	9
Hard	.....	1/20	Mostly	sulphate.....	11
Soft	.....	1/16	Mostly	sulphate.....	10
Soft	.....	1/16	Mostly	carbonate.....	11
Soft	.....	1/16	Mostly	carbonate.....	12
Hard	.....	1/16	Mostly	carbonate.....	12
Soft	.....	1/11	Mostly	carbonate.....	15
Hard	.....	1/9	Mostly	sulphate.....	16

The Cincinnati Health Exposition

From October 15 to 22, 1921, the Cincinnati Public Health Federation is to hold a Health Exposition in the Music Hall. This will be the second serious undertaking of this kind in the United States, the first having been held in Chicago last year. Nearly 100 city, state and national organizations and institutions will be represented in the displays. There will be a number of commercial exhibits, to provide funds for carrying the educational displays and for beauti-

fying and publicizing the Exposition as a whole.

The Exposition, which will be under the supervision of the Public Health Federation (Council of Social Agencies), Chamber of Commerce, U. S. Public Health Service, and the Cincinnati Department of Education, and practically all Cincinnati health and recreational organizations, will attempt to visualize the road to health for the benefit of the entire community.

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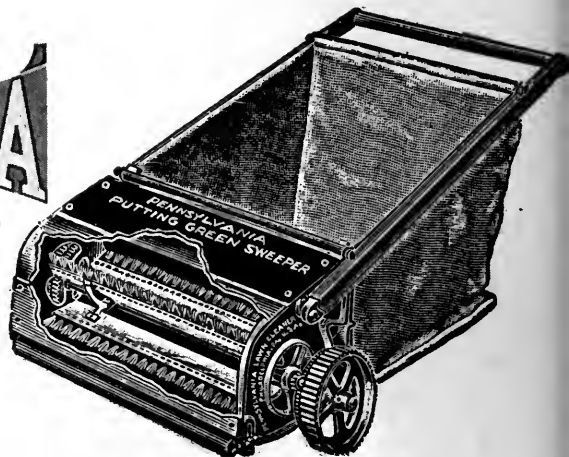
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Chamber of ***** Commerce Activities in Public Affairs

Study of Local History Teaches Value of City Planning

FORT WAYNE, IND.—Through the use of a great developing color sketch, the people of Fort Wayne are being brought to a realization of their opportunity to avoid the mistakes of the past and to use present opportunities to create a more nearly perfect place in which the citizens of the future may live.

B. J. Griswold, a local business man and member of the Chamber of Commerce Publicity Committee, is the artist lecturer. The large drawings are mounted on a background 12 by 18 feet in size, standing on a platform in the assembly room of the Chamber of Commerce, which seats several hundred people. The Chamber of Commerce wished to add something to the regular pro-

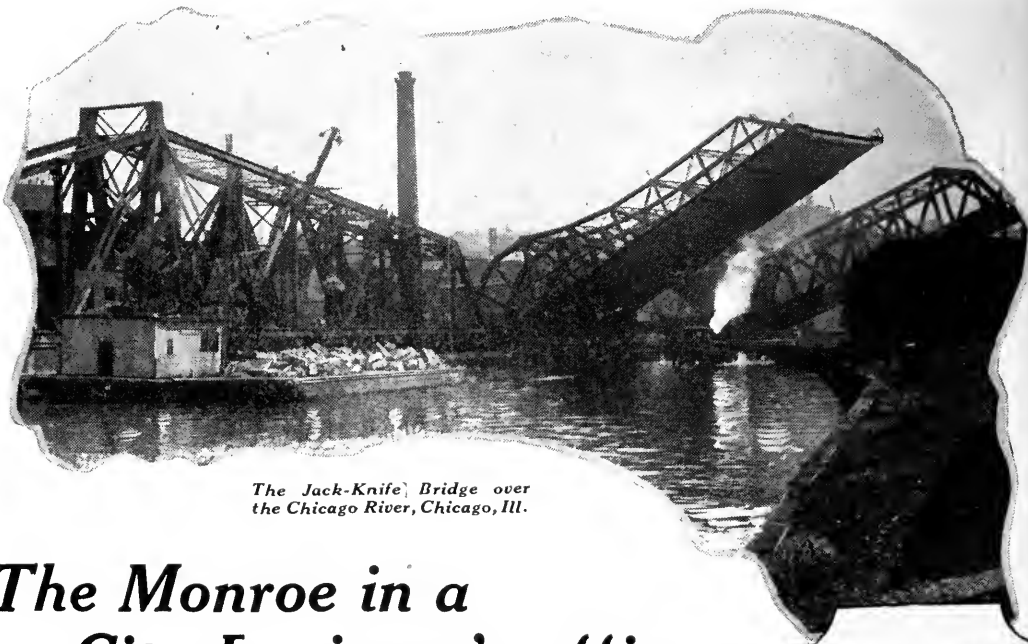
gram of the Chamber which would bring about an awakening of the people to the opportunity to create within the city a future civic center. In response to the Chamber's invitation, Mr. Griswold conceived the plan of teaching his audience the history of the area shown on the drawing-board, and then impressing them with the truth that duty to coming generations calls for quick vision and prompt action.

Mr. Griswold lays the foundation of his talk on the assertion that "the study of local history is one of the most useless and wasteful of 'indoor sports' unless such study makes us into more thoughtful, more intelligent, more sympathetic, more active and more coöperative citizens of to-day."

The first scene shows the landscape in



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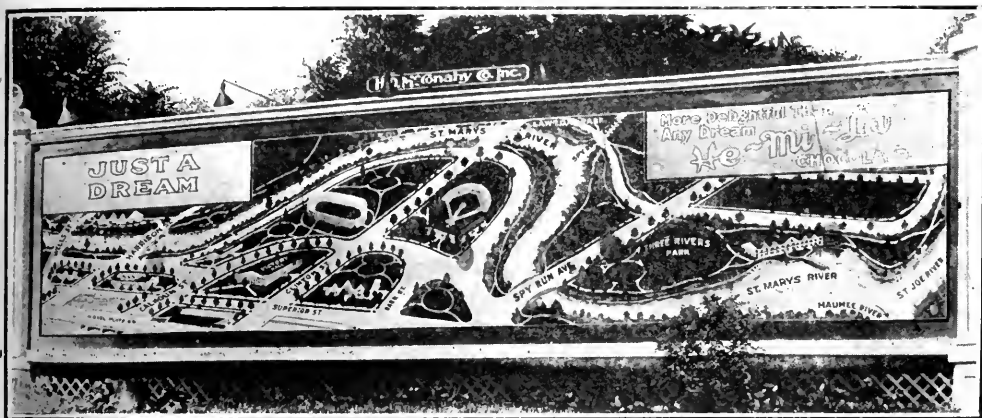
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A FORT WAYNE MANUFACTURER GIVES PUBLICITY TO A PROPOSED WATER FRONT DEVELOPMENT

its primitive state. This area, with its three rivers, includes the ancient Miami Indian village. Scenes two, three and four illustrate the gradual development of the settlement from the building of the first French fort in 1686 through the period of the Indian War and the Revolution, down to the development of the town shortly before the Civil War. At that time all the river banks were available for any plan of parking and the establishment of the civic center, but lack of vision prevented any united action.

Scene Five indicates that portion of the city which occupies the area included within the scope of the original drawing. This is only about one-sixth of the total area of the city. The lecturer shows a tract within a distance of two squares of the court house which is occupied by homes of the secondary order, livery barns, sheds, a baseball park, one or two factories and so forth. A portion of it is owned by the county as the location of a jail, a heating plant and other buildings. The city has purchased as a site for a municipal and county coliseum a tract convenient to the center of this area, which, under proper development, offers extraordinary opportunities for beautification.

Scene Six reveals to the audience a suggestion of the manner in which the river may be utilized, presenting a plan outlined some time ago by Charles Mulford Robinson.

Each audience, having gazed expectantly and wonderingly upon the changing scene, passes out with a new idea of civic possibilities and civic duty; and it is believed that this manner of teaching municipal

needs and personal obligation will have a real influence in giving Fort Wayne one of the finest civic centers in the Middle West.

The Chamber of Commerce unreservedly recommends this method of publicity to the consideration of organizations interested in city planning for their respective municipalities.

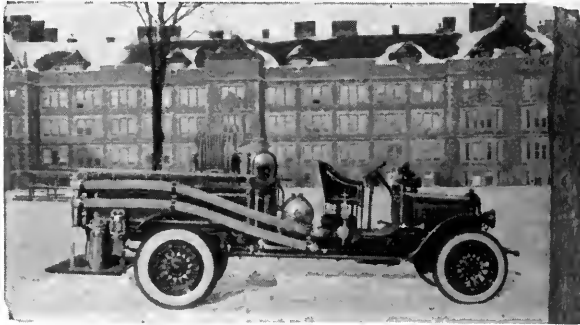
To further popularize the idea of planning for the future, the Heit-Miller-Lau Company of Fort Wayne, confectionery manufacturers, have set an example to the painted billboard users everywhere, as leaders in public spirit.

Mention has been made of the tract near the center of the city which at the present time is occupied by a motley collection of shabby buildings. Some time ago Charles Mulford Robinson suggested a plan to utilize this tract, but through lack of vision and coöperation people have taken little interest in it. A small portion of the tract was purchased some time ago by the city, but unless the surroundings are converted, the site is considered unsuited for its intended purpose.

The design for the billboard pictured herewith was suggested and prepared by Mr. Griswold, to show the possibilities of improving this area. When the billboard painter started work, it was found that he was not able to handle the details of the painting, so Mr. Griswold himself donned overalls, mounted the scaffold, and spent fourteen hours in completing the details of the view.

In order to show the people just what the plan includes, this manufacturing institution has prepared a bird's-eye view of the pro-

Northern Fire Apparatus



Triple Combination on Republic—Ridgefield, Conn.

“We furnish everything but the chassis”

Its Success is Based Upon the Meritorius Performance of the Northern Rotary Pump

Driven by a 27.2 SAE h. p. motor, the *Northern Rotary Pump* has delivered 345 gallons at 120 pounds pressure drafting water.

In tests before unbiased engineers, at various times, the *Northern Rotary Pump* has proven that it will deliver more gallons per minute under any given pressure than any other pump manufactured.

See Your Own Truck Dealer

Your own truck-dealer will quote you a price on your favorite chassis, equipped with Northern Fire Apparatus.

Northern Fire Apparatus Co.

2420 University Ave., S. E.

Minneapolis, Minn.

Sales Offices: Every Truck-Dealer, Everywhere, U. S. A.

posed improvement, which is seen and discussed by the thousands who pass the billboard every week. The display has aroused public interest to such an extent that the Fort Wayne Community Service Council, composed of representatives of twenty-three community organizations within the city, has issued a letter to a great number of Fort Wayne people, asking them to see this picture and then state in a return letter just what they think of the project. These letters will be digested and their contents presented in a comprehensive newspaper article, including the sentiments of all who respond, whether favorable or otherwise.

The letters have been sent to all groups of the population, including business and professional men and laborers. In thus creating public discussion among men of all lines of activity and drawing the question later into the discussions of women's organizations and others, the project will have the benefit of a thorough airing before the matter comes before the city and county boards for action.

It is a wholesome type of civic service, and incidentally is not a waste of advertising space for the Heit-Miller-Lau Company.

H. E. BODINE,
Secretary, Chamber of Commerce of Fort Wayne.

Dallas Chamber Active in Health Work

DALLAS, TEX.—The Public Health Committee of the Dallas Chamber of Commerce has been particularly fortunate in obtaining the coöperation of Dallas citizens, city officials, and the public health authorities during the two years of its work. Part of this coöperation has been due to the placing of progressive business men on the committee, and the remainder is due to an educational campaign along public health lines and a willingness to assist worthy projects once they were thoroughly understood.

The Committee as originally organized was composed of business men, a well-known minister, a health director of a large department store, three local physicians, and the local director of the Public Health Service, giving a well-balanced committee. At first, meetings were held in the Chamber of Commerce every week and a survey was made of the health conditions of the city and the city's means of combating disease, the prime object being to give the members a clear insight into their work. This method

was found to be an excellent way of getting the interest of every member of the Committee, because only a few were familiar with present health methods and particularly the methods used by the city. The result desired, namely, full attendance at meetings, was obtained. Later, campaigns of various sorts were carried out, not only to create public interest, but also to assist the city in its work. One of the most successful of these was a campaign to clean up the down-town streets. The city had placed hooded trash cans on the various street corners, but they were never used until the Committee, with the aid of the newspapers, the Boy Scouts and the newsboys, started in to clean up the street corners. The Boy Scouts carried various sorts of posters, and a prize was given to each newsboy who kept a street corner clean for a week. The result was that the city garbage department was kept busy emptying the trash cans, and the streets became comparatively clean.

Another venture was the preparation of a food-handlers' ordinance a year in advance of the state law. This accomplishment was obtained through a subcommittee made up of the Health Committee and representative food handlers throughout the city—a procedure which eliminated any opposition on the part of restaurant men, soda fountain owners, etc., because they drew up the ordinance themselves. Incidentally, these same men made an ordinance that is far more drastic than the state law and requires physical examination of all employees.

The members are kept posted on the condition of the public health, and reports are published with comparative tables showing the condition of the city. These reports go to the Chamber of Commerce membership and serve to create additional interest in the Department of Public Health. And our experience leads us to believe that the more people that can be interested in this work, the greater the demand will be for health protective measures.

E. A. WOOD,
Secretary, Public Health Committee, Dallas Chamber of Commerce.

School Children Help Bond Issue

ATLANTA, GA.—This city has recently voted a bond issue of \$8,850,000 which provides for the expenditure of bonds in the following manner:

Schools	\$4,000,000
Sewers	1,250,000

Maintaining a Busy New York Highway at Small Cost—

WITH its eight miles of Tarvia pavement, the Grand Concourse and Boulevard in New York City is the favorite route of thousands of motorists bound to and from the suburban districts lying north and east of the city. It is free from mud in winter, spring and fall—free from dust in summer—never “sticky”—smooth and firm all the time.

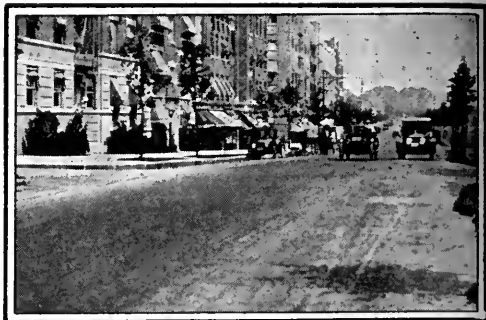
Yet this Tarvia pavement represents a very small investment.

Ten years ago, the old macadam was broken up, resurfaced, and treated with “Tarvia-A,” at a total cost of about one dollar per square yard.

Despite the severe service, only minor repairs and occasional treatments with “Tarvia-B” have been required to keep the roadway in first class condition. This maintenance, including all repairs, over the eight-year period, has averaged less than four cents per square yard annually.

These figures are striking evidence of the economy of Tarvia for road maintenance.

Booklets describing the various uses of Tarvia free on request.



Three views of the Grand Concourse and Boulevard, which give some idea of the heavy traffic over this thoroughfare.



New York
Detroit
Salt Lake City
Johnstown
Elizabeth

Chicago
New Orleans
Seattle
Lebanon
Buffalo

Philadelphia
Birmingham
Peoria
Youngstown
Baltimore

Boston
Kansas City
Atlanta
Toledo
Omaha

The *Barrett* Company

Montreal

Toronto

Winnipeg

Vancouver

St. Louis
Minneapolis
Durham
Columbus
Jacksonville
St. John, N. B.

Cleveland
Dallas
Milwaukee
Richmond
Houston
Halifax N. S.

Cincinnati
Nashville
Bangor
Laird
Denver

Pittsburgh
Syracuse
Washington
Bethlehem

THE BARRETT COMPANY, Limited.

Water-works 2,850,000
Spring Street viaduct.. 750,000

Although the campaign was not held directly by the Chamber of Commerce as an organization, the Chamber and its members were very active in it and the Chamber handled a great part of the mechanical details of the campaign. The greatest feature of the campaign was the extraordinary public interest which was aroused in it by methods of effective publicity. The normal registration from Atlanta is less than 15,000, but through the energetic campaign more than 25,000 persons registered for the election.

The work consisted first in arousing every civic organization, of which there are some 125 in the city. The organizations checked up their members, and if they were not registered they were urged to do so. Meetings were held in every section in the city, and addresses were made by citizens of all classes. The bonds for schools naturally excited the greatest interest and brought about the complete support of teachers, parents and children. School children were used in stimulating their parents to register. Every child was given a slip for the parents to sign, indicating that they had registered, and the child who could not produce such a slip was not popular among his fellows during the campaign.

The unusually large registration is convincing evidence of the effectiveness of the campaign program.

C. E. ROBERTSON,

Secretary, Chamber of Commerce.

Know Your Own City

SOUTH BEND, IND.—Following an industrial survey by the South Bend Chamber of Commerce, it was found that 435 articles were manufactured in the city. In order to acquaint people within the trade area of South Bend with the products manufactured at their very doors, the Chamber of Commerce decided to foster an Industrial or Progressive Exposition. An experienced exposition manager was engaged, and a building costing \$16,000 was erected to house the exhibits. More than one hundred exhibitors secured space in the building for the eleven-day display, which was held June 30 to July 10, 1921.

The exposition, the first of its kind ever held in northern Indiana, was a marked success and received favorable press notices in Indiana and Michigan.

While it was impossible to include every industrial plant in the allotted 45,000 feet of floor space, still a representative number gave the people some idea of the city's industries. The exposition building, a frame structure erected in ten days, was constructed in the form of a Greek cross, having four wings 120 feet each in length. The wings containing the four rows of booths are 80 feet wide. Light, water and sewerage were furnished each exhibitor. In the center of the building a platform 80 feet square was erected and used as a stage for speakers, bands and free acts.

The directors of the enterprise were selected from the membership of the Chamber of Commerce, and the committee had general supervision of the entire exposition.

The financing of the project was cared for out of the exhibit space, which was sold at \$100 per booth of 10 feet square, with the exception of automobile space, which sold for \$150 per booth 10 by 16 feet. Of course, the admission of 55 cents including war tax was also applied.

LEO BERNER,

Publicity Secretary, South Bend Chamber of Commerce.

A Novel Advertising Scheme

NEW ORLEANS, LA.—The Association of Commerce has adopted a novel method of presenting interesting facts about the city of New Orleans and the state of Louisiana. The following paragraph appears in each weekly issue of the *News Bulletin* of the Association:

Stenographers

Help your city by getting permission to add the following to all business letters your organization sends out this week. There will be a paragraph each week; watch for it:

44—New Orleans' lead as second port is \$262,000,000.

The slogan is changed each week. Typical sentences include: "New Orleans has the world's largest cotton warehouse," "New Orleans is investing \$20,000,000 in an inner harbor," "New Orleans' 1920 bank debts exceeded four billion dollars," etc.

It is believed that enough stenographers are using this material to justify the Association in continuing its publication, and the plan is proving an excellent advertising medium for the city.

CHARLES F. WHITE,
Editor, *News Bulletin*.



20 More Reasons Why Worcester Has Less Crime

Worcester, Mass., is another city that has increased its police efficiency by using Harley-Davidson motorcycles. In April, 1920, nine Harley-Davidsons joined the Worcester police force. Now there are 20 in use there, on regular beats, for regulating traffic, chasing speeders, running down "motorized crooks" and for emergency calls.

You can't beat a Harley-Davidson for durability, roadability and dependability. And its economy of gas and oil and low upkeep make it the ideal machine for police work. Hundreds of cities have found it so.

*Prices Down 25%!
Model J Now \$365 (was \$485)
Similar reductions on
all models and sidecars*

*Ask your local dealer for
demonstration. Or write
to us for free book on
police use of motorcycles.*

HARLEY-DAVIDSON MOTOR CO.
MILWAUKEE, WISCONSIN

Harley-Davidson
World's Champion Motorcycle



A BUSINESS STREET IN WICHITA FALLS, TEX., SHOWING THE NEW LIGHTING SYSTEM

This remarkable picture is a double print from two films, one taken by daylight and the other by the night illumination alone. By superimposing the films features of the section both by day and night are shown

Chamber Promotes Street Lighting Installation

WICHITA FALLS, TEX.—This city has just completed at a cost of \$65,000 the installation of a system of ornamental street lights throughout 45 blocks of the business district. Three hundred and forty Union Metal standard design No. 1538 were used, with General Electric Form 8 Novalux units.

The Chamber of Commerce promoted the idea of the new street lighting system, collected the money from property owners at the rate of \$2.60 per front foot, made all contracts, purchased all material, handled accounts, placed a man from the Chamber of Commerce office in charge of the job working as supervisor, and put over the entire project as a property owners' movement. At the completion of the system it was turned over to the municipal authorities upon their agreement to maintain it and pay the expense of electrical current during the life of the system. The property owners' initial payment of \$2.60 per front foot for installation is all that they will ever have to pay.

There are approximately five miles of lighted front footage. The 340 lamp standards are arranged eight to each block on each side of the street and placed opposite and in regular order. This throws eight lights at street intersections. Lights at the intersection of streets are placed on a line with the buildings.

Standards are 13 feet 3 inches high from the base to the light source. The lighting unit contains one single 400-candle-power light. The standards are 15 inches in diameter at the base and above this is a pressed steel shaft tapering from 8 inches to 6 inches. The lighting unit also consists of casing, globe, metal ventilator, internal reflector of aluminum, and series socket. The globe is 12 7/16 inches high and 13 1/4 inches wide. Standards are anchored to concrete base with 5/8-inch steel anchor rods. Each standard is equipped with automatic connecting potheads insulated for 11,500-volt service of series system, so that any one or more lights may be extinguished without interrupting any other part of the system.

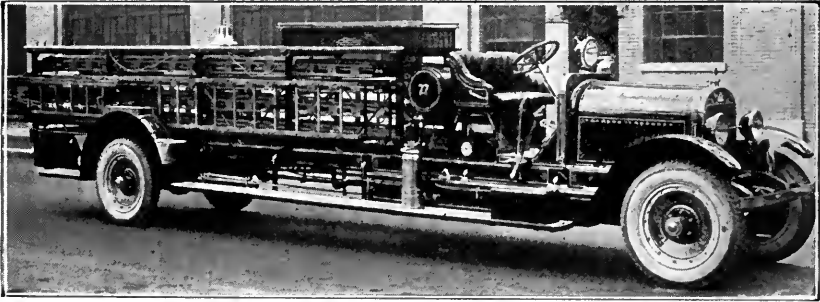
Approximately eight miles, of 41,000 feet, of cable were laid. The cable is heavy marine, single conductor, varnished cambric insulation of 10 3/32-inch, lead 5 1/64-inch, two wrappings of steel armor .37-inch for voltage 11,500.

The system was completed on March 11, 1921. About five months was consumed in this work. This was rapid work, as most of the cable was laid under concrete sidewalks. A trench 4 inches wide and 4 inches below the concrete was made for the cable. There are five circuits of approximately 60 lights to the circuit. Five 20-k.w. transformers are used, one to each circuit.

C. F. CARTER,
Publicity Manager, Chamber of Commerce.

*Standardized and
Engineered for
Fire Service only*

STUTZ



FROM THE ATLANTIC TO THE PACIFIC— FROM TEXAS TO MINNESOTA

In all Climates—Under all conditions—High Altitudes and Sea Levels The STUTZ has made exceptional Records in Actual Service.

See our latest CITY SERVICE TRUCK—a Marvel of Strength and Beauty.

Perfect Scores on our 1000, 750, 600 and 500 Gallon Pumps.

Not assembled but DESIGNED and Built for Fire Service only by STUTZ.

25 Pumps and 10 Service Trucks in daily Service in Indianapolis. Perfect Satisfaction—Service, Unsurpassed.

MERIT WINS!

GOODS WILL TELL!

WE WANT YOUR BUSINESS .

For Reference—ASK THE CHIEF, WHO USES THEM.

For Full information on these Wonderful machines write—

STUTZ FIRE ENGINE CO.

INDIANAPOLIS

INDIANA



Municipal Finance

BONDING

ACCOUNTING

TAXATION

The Houston Plan of Valuation and Taxation—Part I

By H. A. Halverton

Tax and Land Commissioner, Houston, Tex.

THE city of Houston, Tex., has a population of 138,276, an area of 38 square miles, with 29,000 renditions, with 13,314 taxpayers on the *Rendered Roll, and over 10,000 on the Unrendered Roll, with a valuation as follows: land, \$99,721,130; improvements, \$45,370,550; personal property, \$36,621,250; a total of approximately \$181,000,000.

The tax rate is \$2.35 on the \$100 valuation, and is divided as follows: first, for general purposes, \$1.10½; second, for interest on bonds and sinking fund, 72 cents; third, for school purposes, 50 cents; fourth, for library purposes, 2½ cents; which produces a total revenue of \$4,159,000.

Prior to 1911 the taxing system, as well as the valuation of land and improvements, was not only antiquated and inadequate, but unscientific, and in a number of instances worked a great injustice to the taxpayer. Since 1911, or more particularly 1912, the unit system of equalization of real estate values for taxation purposes has been in operation, and from these years of experience, and my personal observation, the unit

system has been a success. Of course, any system of taxation, no matter how perfect at one time, will in a few years get out of line in a greater or lesser degree. Conditions in a growing city are continually changing, and constant vigilance has to be exercised to keep in touch with the changing conditions of value of all assessable property.

In the Houston Tax Department men are assigned to different duties, classified as follows: first, building appraiser; second, personal property appraiser; third, land appraiser and calculator; and fourth, but not least, three men composing the Board of Appraisement.

The Tax Department Records

The records compiled for the use of the Tax Department are best identified by the following description:

One set of computation slips showing in detail the method of arriving at the value of the tract, giving the width of the lot, the depth, unit value or values, the number of the lot, block, addition, and the owner.

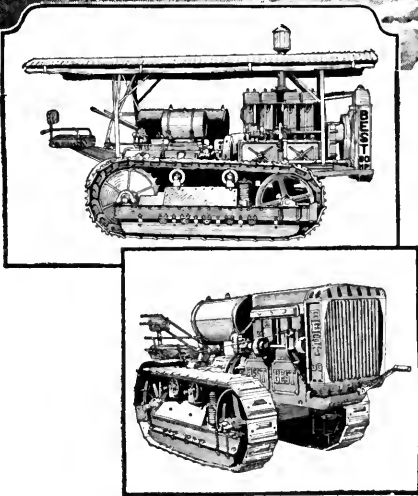
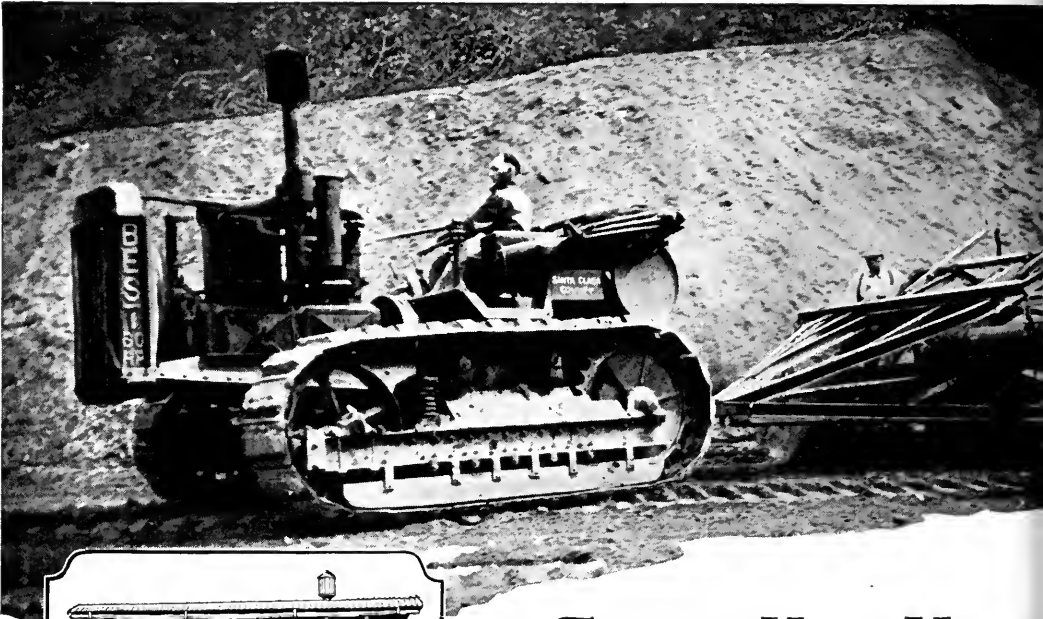
One set of building record cards showing the size, the number of stories, and detailed information regarding the exterior and interior of every building within the city, including an estimate of its present value based upon what it would cost to reproduce, less depreciation for age, condition, obsolescence, or lack of utility.

One set of field books showing the location of every building in the city.

One set of sectional maps showing the unit foot values and all acreage values of the entire city. This map is used in submitting the unit foot or acreage value to the

* Rendered Roll.—It is the duty of every person owning, holding or controlling property within the limits of the city of Houston, subject to taxation under the laws of the state and ordinances of the city of Houston, to render to the City Assessor and Collector, at his office in said city, or his authorized deputy, annually between the first day of January and the first day of March, a full and complete list or inventory of all property owned, held or controlled by such person or corporation, either as agent or attorney, trustee, guardian, executor or administrator, and to take and subscribe to an oath as to the correctness of such list or inventory.

Unrendered Roll.—It is the duty of the City Assessor and Collector, or his authorized deputy, to inventory on assessment sheets of appropriate form and to assess the same at what he believes to be the full and true value of same, the property of persons failing to render the same in for assessment, and such assessment or inventory shall be as valid and binding as if such property had been rendered by the owner thereof.



BEST TRACKLAYER TRACTORS

The picture above shows the Best "Cruiser" doing road work with a Schmeiser leveler. The center picture shows the Best Tracklayer "Sixty" and the lower picture is the "Thirty". All three models of Best Tracklayer Tractors are factory-built—not assembled.

Tractors Have Many Advantages

One advantage a good tractor has over animals is the ability to work fast in close quarters.

Power is in compact form, easily manipulated and managed by one man. The pull is steady. No easing up when plows, grader, etc., strikes the tough spots. The work is thorough and the speed fast.

In fact, the right kind of tractor reduces the cost of major operations in road, street and highway construction and maintenance. It cuts down time, reduces labor and eliminates the feed bills.

This year, more than ever, interest centers around reduction of operating expenses. Good tractors, such as Best Tracklayer Tractors, can do much to reduce this cost.

An investigation will show that Best Tracklayer Tractors have earned a reputation for long life, stamina and low operating cost during the many years they have been successfully performing on heavy-duty work.

A request will bring data on Best Tracklayer Tractors, specifications, prices and the names of our nearest dealers. Now is the time to look into the question of good tractors.

C. L. BEST TRACTOR CO.

San Leandro

California

property owner for criticism or approval.

One index map showing the boundaries and number of each sectional map.

One set of block books and plat books covering the entire city; block books showing individual plats of each block as recorded; block books showing subdivision of acreage tracts.

The Building Appraiser's Work

The building appraiser in conjunction with, and for the information of, the Board of Appraisalment inspects and measures and figures the reproductive cost of practically every building in the city, applying the same unit value to all buildings of like type, material and workmanship. By "unit of value" is meant the cost per square or cubic foot, as the case may be. For large buildings of fire-proof or semi-fire-proof construction, experience has proved that the cubic foot is the more accurate unit of measurement, while for ordinary residences the square foot is preferable. The same unit of measurement and the same unit of value must be used in buildings of like type and quality, or inequalities will exist.

Having determined the reproductive cost of the building, the next step is to determine the amount of depreciation due, if any. Many things may cause depreciation, but the three principal causes are age, physical condition and utility purposes. For these there can be no fixed rate, but each building must stand on its own merits, since in some cases all the causes may exist, while in others only one may be there. Yet even here it will be found that in buildings of like type, quality and age the rate of depreciation will not vary greatly.

There are many interesting questions in connection with this branch of the department. Two facts deserve to be emphasized: first, the reproductive value and amount of depreciation which is fixed by the building appraiser. If the owner's cost is taken, inequalities are sure to exist, since it often happens that one may pay less than the building cost, while another pays more than it is worth. Second, property on the Un-rendered Roll receives the same care and attention as that on the Rendered roll. The

men assigned to this particular work are men that have had many years of experience in building construction, and are especially adapted for this particular work and imbued with the spirit of justice. There should be no desire on the part of the building appraiser to overvalue one because he or she can afford to pay, nor undervalue another because he or she is poor. All are treated alike.

The Personal Property Appraiser

The duties of the personal property appraiser are to equalize all personal property

assessments in conjunction with, and for the information of, the Board of Appraisalment. In order to do this, he obtains from the owner the full value of personal property on hand January 1 of each year, and the assessment is based on 60 per cent of the actual value. The large merchants give their inventory on that date, or nearest thereto, as their basis of value. With the smaller merchant who usually takes no inventory, an estimated value is placed upon the stock and fixtures by the appraiser, and the same percentage of value is applied on the small stock as on the larger one.

To be continued in the October issue.

Form 381

BUILDING ASSESSMENT
HOUSTON, TEXAS

Owner192..

No.

AdditionStreet or Avenue

Vol..... Page..... Block..... Tract.....

.....

.....

.....

SIZE OF BUILDING

.....widedeepstories

.....widedeepstories

.....widedeepstories

With or without basement or cellar.

Foundation: Walls or Piers.

Material: Frame, Brick,

Outside Trimmings: Plain, Ornamental.

Inside Finish: Rough, Plain, Ornamental,

Hard Wood, Pine, Plaster.

Roof: Hip, Gable, Flat.

Roofing: Slate, Tile, Tin, Shingle, Copper,

Composition, Iron, Tar and Gravel.

Heating: Furnace, Steam, Gas, Stoves.

Plumbing: With or Without Bath Room.

Condition: Good, Fair, Bad. Built in Year...

No. Sq. Ft. Per Sq. Ft.

Reproductive Value, \$.....

Age, Cond. and Utility Dep.....per cent.

Amount of Depreciation, \$.....

Present Value, \$.....

Brought Forward, \$.....

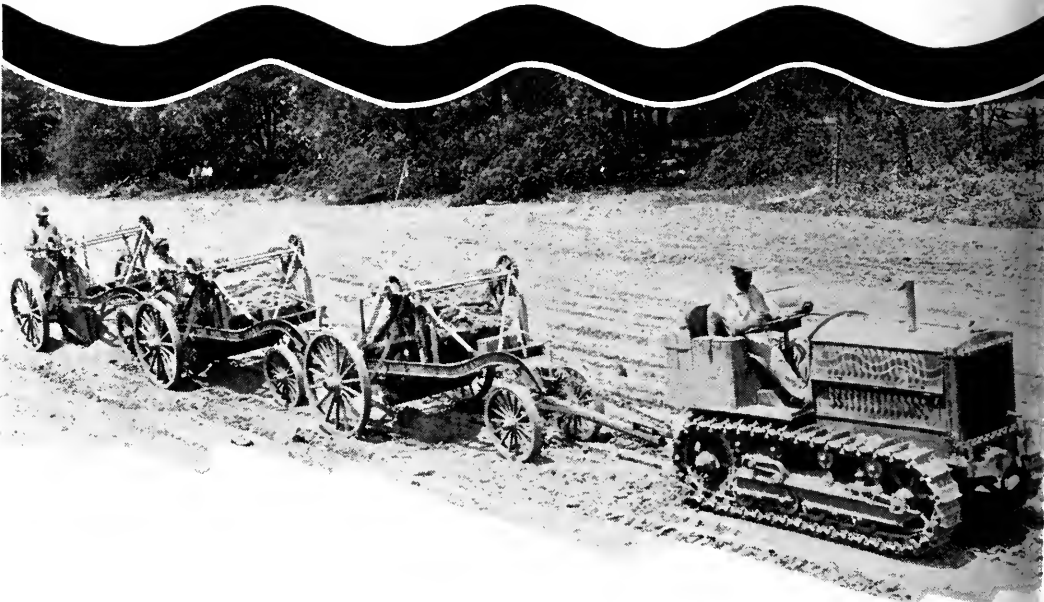
Assessed Value of Bldg., \$.....

.....

.....

.....

ASSESSMENT FORM USED IN HOUSTON



There Is Always Work For Them To Do

The "Caterpillar's" usefulness is not limited to snow removal. For road building, working on farm or ranch, in the mining, oil and lumber industries — wherever power and endurance are at a premium the "Caterpillar"* has no real competitor*

New York's fleet of 50 "Caterpillars"* saved the City enormous amounts in snow removal work last winter. Scores of other progressive municipalities and road districts are already equipped with "Caterpillar"* snow removal outfits. Many more are preparing now for next winter. The "Caterpillar"* is an all year 'round, all-weather tractor. Besides operating snow plows, it is profitably used for building roads, making parks, hauling garbage, disposal trains, and providing power for every emergency. The "Caterpillar"* method cuts the cost of public improvements. Let us show you motion pictures of "Caterpillars"* in action, or arrange a demonstration.

**There is but one "Caterpillar"—Holt builds it*

CATERPILLAR
Reg.U.S. Pat.Off.

HOLT
PEORIA, ILL.
STOCKTON, CALIF.

THE HOLT MFG. CO., Inc., PEORIA, ILL.

Branches and service stations all over the world

Eastern Division: 50 Church Street, New York

2429 Farnam St., Omaha, Neb.
417 Washington Ave., Minneapolis, Minn.
5th & Court Sts., Des Moines, Iowa.
2045-47 Main St., Kansas City, Mo.
Holt Company of Texas, Dallas, Texas

The City's Legal Rights and Duties

Information for City Attorneys and Other Municipal Officers, Summarizing
Important Court Decisions and Legislation

Conducted by A. L. H. Street, Attorney at Law

Ordinance Regulating Purchases at Public Market Upheld

The Pennsylvania Court of Common Pleas at Harrisburg has filed an opinion supporting the validity of an ordinance of that city, prohibiting the buying of provisions in the city markets for purposes of resale, and forbidding persuasion or agreements to raise the prices of commodities sold in such places.

In this case (City of Harrisburg vs. Strock, 12 Pennsylvania Municipal Court Reporter, 87) defendant was prosecuted for buying a basket of apples at one of the Harrisburg municipal markets, with the purpose of reselling them. Her defense was that the ordinance under which she was prosecuted was invalid. Overruling this defense, the Court follows the reasoning of the Pennsylvania Superior Court in the case of York City vs. Hatterer, 48 Pennsylvania Superior Court Reports, 216, where that tribunal said, in part:

"The necessity of a public market, where producers and consumers of fresh provisions can be brought together at stated times for the purchase and sale of those commodities, is very apparent; there is nothing which more imperatively requires the constant supervision of some authority which can regulate and control it. . . . It can never be so well placed as when it is put into the hands of the corporate officers who represent the people immediately interested. A municipal corporation, comprising a town of any considerable magnitude, without a public market subject to the regulation of its own local authorities, would be an anomaly which at present has no existence among us. The state might undoubtedly withhold from a town or a city the right to regulate its market, but to do so would be an act of mere tyranny and a gross violation of a principle universally conceded to be just, that every community, whether large or small, should be permitted to control, in their own way, all those things which concern nobody but themselves. The daily supply of food to the people of a city is emphatically their own affair. It is true, that the persons who bring provisions to the market have also a sort of interest in it, but not such an in-

terest as entitles them to a voice in its regulation. The laws of a market (I am now using the word in its largest sense) are always made by the persons who reside at the place, and that whether they be buyers or sellers. It is, therefore, the common law of Pennsylvania, that every municipal corporation which has the power to make by-laws and establish ordinances to promote the general welfare, and preserve the peace of a town or city, may fix the time or places of holding public markets for the sale of food, and make such other regulations concerning them as may conduce to the public interest: *Wartman vs. Philadelphia*, 33 Pa., 202. It was in that case held that the city might at any time remove the public market from one place to another."

Land Owned by Street Railway Company for Right of Way Held Assessable as "Abutting Property" for Street Improvement

A street railway company bought a strip of land 30 feet wide and more than 1,700 feet long for private use in operating its railroad. Later an avenue was dedicated and laid out in such a manner as to embrace the strip along its center. Still later the avenue was paved, curbed and guttered, and question arose as to whether the strip was assessable therefor as "abutting property." The Missouri Supreme Court holds in the case of *Meryl Realty Co. vs. Granite-Bituminous Paving Co.*, 223 Southwestern Reporter, 904, that the railroad land was so taxable.

"In this case," observes the Court, "the railway company has deliberately elected to purchase its right of way from the private owner of the land in fee for its own exclusive use. It stands precisely as it would have stood had the entire street been afterward dedicated upon and along one side of it. Had it acquired the same right of way from the city after the dedication of the street, it might have been burdened with such duties of improvement and repair as the city saw fit to impose, but this transaction would seem to have been made for the

THIS NEW P & H SKIMMER SCOOP SAVED \$83.44 PER DAY ON A ROAD-GRADING JOB



This Rapid Road-Grading Boom and Scoop May be Attached to any P & H 205 or 206 Excavator-Crane.

Here is a way to speed up your road-grading work and save money. The Skimmer Scoop may be used in place of the Standard Boom furnished with P & H Excavator-Cranes.

We have a supply of the new Bulletin TX which gives detailed data on a road-grading job showing remarkable savings in time and money. We are ready to send you a copy on request.

Excavating Machinery Division
PAWLING & HARNISCHFEGER CO.
Milwaukee, Wis., U. S. A.

Offices and Agents in all parts of the Country.

P & H EXCAVATOR-CRANE

purpose of obtaining all the advantages of a street location without any of its burdens. It had the choice to come into the street for all purposes or to remain out of it for all purposes and chose the latter course and became an adjoining proprietor, with all the burdens incident to that relation. One of them is participating in the burden of taxation as an abutting proprietor with reference to this improvement, and we hold that it is so liable to the same extent as if it had been incorporated for horticultural purposes and the land had been conveyed to it for use as an orchard."

City's Rights When Successful Bidder for Public Work Fails to Comply with His Proposal

An opinion on the rights of a municipal corporation against a successful bidder who fails to carry out his proposal, and on the privilege of such corporations to employ non-resident experts, was handed down by the Kansas Supreme Court in the case of *Middletown vs. City of Emporia*, 186 Pacific Reporter, 981.

Defendant city invited proposals for the construction of improvements in its water-works system. Plaintiffs made a bid, accompanied by a deposit to secure entry into a contract on acceptance of the proposal. The bid was accepted, but plaintiffs failed to carry out the contract. They afterwards sued to recover the deposit, but the Supreme Court has affirmed judgment in favor of the city on a counter claim for damages in excess of the deposit. The substance of the opinion on appeal is as follows:

In the absence of charter or statutory provision to the contrary, a city may contract for public work through a public letting after an advertisement of the same. Authority given a city to have work done implies the right of the governing authorities to exercise reasonable discretion to contract in any practicable method that will safeguard the public interests.

When a city advertises for proposals conforming to plans and specifications furnished bidders, formal acceptance of a bid concludes a binding contract, despite a stipulation that the contract so made is to be reduced to formal writing.

On plaintiffs' failure to carry out the contract it was proper to forfeit the deposit in liquidation of the city's damages through the successful bidder's breach of contract.

It was contended by plaintiffs that no legal contract could be entered into under the facts of the case, because the plans and specifications had been prepared by non-resident engineers, instead of by the city engineer, thereby invalidating the proceedings. The Court overrules this position, saying:

"The investigations, estimates, plans and specifications for a water-works plant were highly expert, and required skill and experience not ordinarily possessed by engineers appointed by the municipalities of the state. The qualifications of those chosen by the city are not questioned, and while they could not perform the general duties of city engineers nor any duties except those connected with the proposed improvement, yet as to these they were in fact city engineers."

Where City's Agreement to Make Park Improvements Was Consideration for Conveyance of Property to It, City Held Liable for Damages on Failure to Perform

Plaintiff owned tracts of land in Huntington, W. V., separated by a creek. While he was improving them by constructing a park, a boulevard, bridges, etc., with a view to making advantageous sales of home sites, the city proposed that he deed certain parts of the land to it, in consideration of its completing the park, etc., improvements, according to certain plans and specifications prepared by the city's agents. The proposal of the city was accepted, and plaintiff conveyed to the city as he had agreed to do so.

But claiming that the city refused either to carry out its part of the bargain or reconvey the property to him, plaintiff sued for damages. The West Virginia Supreme Court of Appeals upholds the right to recover. (*Whittaker vs. City of Huntington*, 107 Southeastern Reporter, 121.)

First, it is determined that charter power to establish streets and bridges and to acquire parks, etc., authorized the city to enter into the contract.

And, the contract being valid, it was decided that the city could not keep the land and at the same time disregard its covenants concerning its improvement. The Court says:

"A municipality, whatever may be its character, whether a city or town, can no more violate with impunity its solemn obligations, lawfully contracted, than can a private corporation, a partnership, or an individual. The obligation to deal justly rests upon all persons alike, whether natural or artificial."



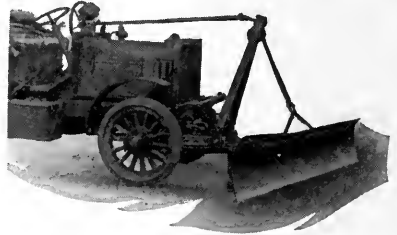
BAKER

AUTO TRUCK SNOW PLOWS

Attached to Standard Motor Trucks.

Cities, Road Officials, Parks, Cemeteries and large industries can make good use of their motor trucks by attaching the Baker Auto Truck Snow Plow.

We also make Snow Plows for leading makes of tractors.



Act on your snow plow requirements now. Have them ready before it snows. We offer you a time-tried plow backed by our long snow plow experience. Patent, hinged, spring-supported blades prevent injury to truck or plow when hitting crossings or man-holes. Special axle clamps permit attachment without drilling. Easily attached, easily operated.

Ask also about our Horse-Drawn Snow Plows.

THE BAKER MFG. CO.

503 Stanford Ave.,

Springfield, Ill.

Notice of Change of Name

FREDERICK SNARE CORPORATION

Formerly

The Snare and Triest Company

CONTRACTING ENGINEERS

Waterfront and Harbor Improvements

Bridges

Storage Sheds and Buildings

Railroad Terminals

Frederick Snare, President

A. W. Bутtenheim, 1st Vice-Pres. E. S. Skillin, 2nd Vice-Pres.

Frederick Snare, Jr., Sec'y & Treas.

Organized 1900.

Capital and Surplus \$1,000,000.

Philadelphia Office:

Main Office:

Havana, Cuba, Office:

1524 Chestnut Street.

8 West 40th St., New York

Zulueta, 36 D.

Municipal and Civic Publications

Prices do not include postage unless so stated.

CONCRETE DESIGNERS' MANUAL

By George A. Hool, Consulting Engineer, Professor of Structural Engineering, University of Wisconsin, and Charles S. Whitney, Structural Engineer, Milwaukee, Wis. McGraw-Hill Book Company, Inc., New York City. 1921. VII + 276 pp. Diagrams and tables, \$4.

This manual, with its extensive tables and diagrams for the design of reinforced concrete structures, makes possible the rapid designing of structures of this type in accordance with the Joint Committee recommendations, the American Concrete Institute recommendations, the New York Building Requirements and the Chicago Building Code requirements. This book will be found of great value to municipal authorities in charge of various types of building construction. The use of the tables is so simple that any technical man conversant with concrete practice will find the data in them readily accessible.

COURSE IN CITY PLANNING

"City Planning and Civic Art," an outline of the course offered by Columbia University, for the academic year 1921-22. (Apply to George Herbert Gray, Director, Department of City Planning, Columbia University, New York City, N. Y.)

FUELS FOR HAND-FIRED BOILERS

"Value of Mixtures of Coke Breeze and Bituminous Coal as Fuel for Hand-Fired Boilers," by John Blizard and James Neil, Fuel Engineers, Bureau of Mines. Published as Serial No. 2244. Report of Investigations, Bureau of Mines, Department of the Interior. 27 pp. Diagrams. May, 1921. (Apply to authors, address above.)

MUNICIPAL REVENUE

"Proposed Increases in Revenue for the Chicago Schools, a report prepared by the Chicago Bureau of Public Efficiency. 16 pp., with a table showing the effect of proposed tax rates on amounts of taxes levied in Chicago and Cook County. (Apply to Harris S. Keeler, Director, Chicago Bureau of Public Efficiency, 315 Plymouth Court, Chicago, Ill.)

COMMUNITY CLUBS

"Community Clubs in the Smaller Towns and Country Districts," published by Albert Pick and Company, 208-224 West Randolph Street, Chicago, Ill. A discussion of the need of such clubs, and an account of their organization and operation. (Apply to publishers.)

HEALTH WORK IN CHINA

Four pamphlets, issued by the Council on Health Education, 4 Quinsan Gardens, Shanghai, China. "Famine Fever," a health manual on typhus; "Kill the Fly;" "Modes of Infection and Prevention;" "The Disease Which Pauperizes the People and Deteriorates the Race," a manual on the hookworm. Also examples of Chinese health posters. (Apply to publishers.)

GAS PURIFICATION

"Some Conditions Affecting the Usefulness of Iron Oxide for City Gas Purification," by William A. Dunkley, State Geological Survey Division. Published as Bulletin No. 119, Engineering Experiment Station, by the University of Illinois, Urbana, Ill. 62 pp. Diagrams. 1921. This report was prepared under a co-operative agreement between the Engineering Experiment Station of the University of Illinois, the Illinois State Geological Survey, and the U. S. Bureau of Mines. (Apply to The Engineering Experiment Station, University of Illinois, Urbana, Ill.)

Municipal Reports

Buffalo, N. Y.—Ninth Annual Report of the Children's Court. 1920. (Apply to George E. Judge, Judge Children's Court of Buffalo, Buffalo, N. Y.)

Charleston, S. C.—Fourth Annual Report of the Commissioners of Public Works, Water Department. 1920 (Apply to J. E. Gibson, Manager and Engineer, Water Department, Charleston, S. C.)

Chicago, Ill.—Forty-ninth Annual Report of the House of Correction of the City of Chicago. For the period ending December 31, 1920. (Apply to Joseph Siman, Superintendent, House of Correction, Chicago, Ill.)

Cleveland, O.—Codified Ordinance. Published as the copy of The City Record for June 13, 1921. (Apply to C. J. Benkcski, Clerk of Council, 816 City Hall, Cleveland, Ohio.)

Evansville, Ind.—Annual Report of the Comptroller and the Water Works Department, for the fiscal year ending December 31, 1920. (Apply to William H. Elmendorf, Comptroller, Evansville, Ind.)

Fitchburg, Mass.—Twenty-seventh Annual Report of the Park Commissioners. 1920. (Apply to Guy A. Hubbard, Clerk, Board of Park Commissioners, Fitchburg, Mass.)

Kansas City, Mo.—Report of the Board of Fire and Water Commissioners, for the year ending April 19, 1920. (Apply to Emmet Lynch, Secretary, Board of Fire and Water Commissioners, Kansas City, Mo.)

La Grande, Ore.—Annual Report of the City of La Grande, Ore., for the year 1920. (Apply to George Garrett, City Manager, La Grande, Ore.)

Milwaukee, Wis.—Annual Report of the Milwaukee Water Works, for the year ended December 31, 1920. (Apply to H. P. Bohmann, Superintendent of Water Works and Water Purification, Milwaukee, Wis.)

Minneapolis, Minn.—Thirty-eighth Annual Report of the Board of Park Commissioners. 1920. (Apply to J. A. Ridgway, Secretary, Minneapolis, Minn.)

New York, N. Y.—Fifteenth Annual Report of the Board of Water Supply of the City of New York, accompanied by the Report of the Chief Engineer. Janu-

ary 1, 1921. (Apply to George J. Gillespie, President, Commissioners of the Board of Water Supply, Municipal Building, New York, N. Y.)

Omaha, Nebr.—Municipal Statistics. City of Omaha, 1921, Department of Accounts and Finance. (Apply to Dan B. Butler, Commissioner of Finance, Omaha, Nebr.)

Portland, Me.—Annual Report of the Park Commission. 1920. (Apply to Isaac F. Clark, Secretary, Portland, Me.)

Portsmouth, Va.—Municipal Reports, City of Portsmouth, Va., for twelve months ending December 31, 1921. (Apply to L. C. Brinson, City Clerk and Auditor, Portsmouth, Va.)

Princeton, Ill.—Auditor's Report for the year ending April 30, 1921. (Apply to Harry Snell, Commissioner of Accounts and Finances, Princeton, Ill.)

Providence, R. I.—Annual Reports of the City Plan Commission for the years 1915-1920. (Apply to John Hutchins Cady, Secretary, City Plan Commission, Providence, R. I.)

Quincy Mass.—Annual Report of the Officers of the City of Quincy, Mass., for the year 1920. (Apply to Emery L. Crane, City Clerk, Quincy, Mass.)

Sacramento, Calif.—Park Report, Board of Park Directors, Sacramento, Calif. 1921. (Apply to Frederick N. Evans, City Landscape Architect, Sacramento, Calif.)

San Francisco, Calif.—Report of the City Plan Commission, with Proposed Zone Plan. 1920. (Apply to M. M. O'Shaughnessy, City Engineer, San Francisco, Calif.)

Seattle, Wash.—Annual Message of Hugh M. Caldwell, Mayor. June 6, 1921. (Apply to Hugh M. Caldwell, Mayor, Seattle, Wash.)

Shanghai, China.—Report of the Shanghai Municipal Council for the year 1920 and Budget for the year 1921. (Apply to Brooke Smith, Chairman, Shanghai Municipal Council, Shanghai, China.)

Westerville, Ohio.—Fifth Annual Report of the City Manager to the Village Council. 1920. (Apply to Ralph W. Orebaugh, City Manager, Westerville, Ohio.)



Cletrac Pays Its Way in Any Town

CLETRAC is ready for almost any road or maintenance job around the town. It more than pays its way by doing better work and more of it, and by handling jobs that might "stump" other power.

Cletrac works tirelessly through the hottest or coldest day. It pulls the scraper, or grader, or sprinkler; and its *two tank-type tracks* walk easily up hills, and over soft new roadbeds or old torn up roads with loaded dump wagons or other machinery.

Municipal jobs such as cleaning out gutters, snow clearing, and operating concrete mixers, pumps and small stone crushers, are easy for Cletrac. New York City owns 100 for snow clearing alone.

Learn how Cletrac will pay its way in your town. See the Cletrac dealer near you or write direct to us for full information.



HARD THIS
WAY, BUT—

THE CLEVELAND TRACTOR CO.

Largest Producers of Tank-Type Tractors in the World
19205 EUCLID AVENUE CLEVELAND, OHIO



EASY ON A TRACK
THE CLETRAC WAY

Methods, Materials and Appliances

News for Boards of Public Works, Engineers, Contractors, Purchasing Agents, and Others Interested in the Economical Construction and Efficient Operation of Public Improvement Undertakings

Diesel Engines for Municipal Service

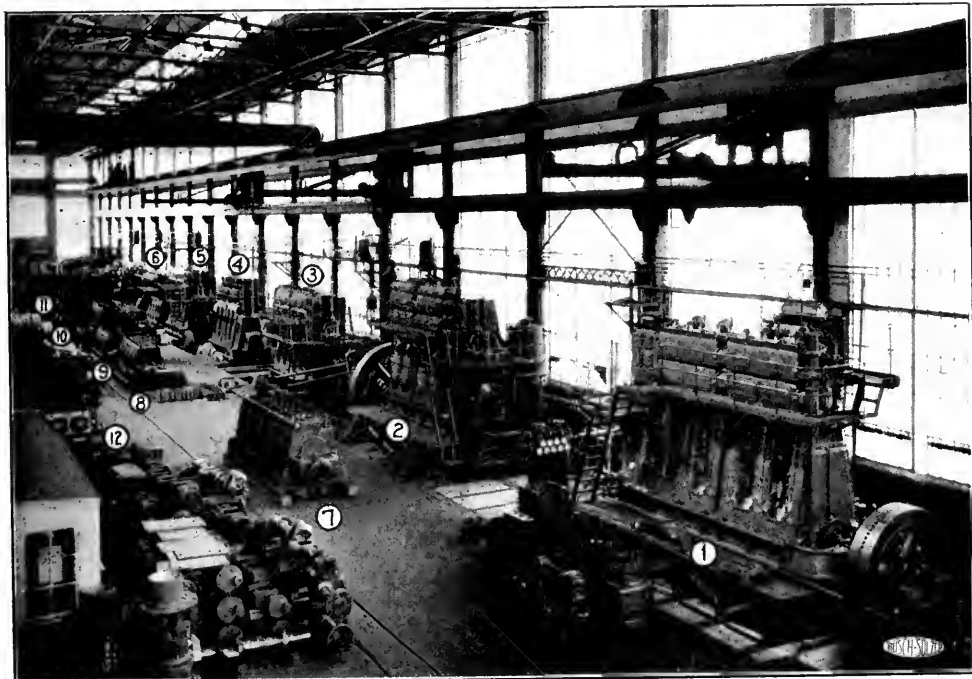
The illustration below shows the erecting or test floor in the Busch-Sulzer Bros. Diesel Engine Co. factory, St. Louis, Mo. It is interesting to note that of the 5,775 horse-power of Busch-Sulzer Diesel engines shown on this floor, 3,960 horse-power, representing 8 out of the 12 engines shown, are for municipalities varying in size from 2,500 to 2,701,705. The following legend shows the size and purchasers of the various engines shown:

1. 750 H.P., City of Palo Alto, Calif.
2. 750 H.P., Central Texas Ice & Light Co., Marlin, Tex.
3. 750 H.P., Sanitary District of Chicago, Ill.
4. 750 H.P., Sanitary District, of Chicago, Ill.
5. 750 H.P., Sanitary District of Chicago, Ill.

6. 365 H.P., City of Osborne, Kans.
7. 520 H.P., Trenton Gas & Electric Co., Trenton, Mo.
8. 365 H.P., Liberal Light, Ice & Produce Co., Liberal, Kans.
9. 250 H.P., Town of Ruston, La.
10. 180 H.P., Ada Water & Light Co., Ada, Ohio.
11. 165 H.P., City of Delphos, Kans.
12. 180 H.P., Town of Paullina, Iowa.

The Use of Elevated Steel Water-Tanks

Inasmuch as the pressure and quantity of water are of vital importance in any community, public officials should consider the most expeditious manner of securing storage for these purposes. Not all cities are favored with hills suitably situated either within or closely adjacent to the city limits where reservoirs may be



THE ERECTING FLOOR OF BUSCH-SULZER BROS. WITH AN INTERESTING DISPLAY OF DIESEL ENGINES



Keep Your Roads Open This Winter

Snowed in streets and roads are a thing of the past now. And every town, township and county realizes that such conditions bring loss and danger to the people of the community.

Keeping your roads open all the time is simple and easy with the Phoenix

Snow Plow. Present users of the Phoenix pronounce it an indispensable piece of road equipment. Wherever it has been employed the labor and expense of keeping roads open has been reduced to the minimum. But its important value is that roads are always open and usable when they are needed.

Phoenix Snow Plow

For Town and Country Roads

Operated by horses, truck or with the power used to push or pull the plow, the Phoenix gives you an economical and efficient plow that clears your roads quick and easily. Strong, powerful construction—built of selected hardwood re-enforced by heavy forging and castings, the Phoenix Plow will outwear any plow manufactured. Plows to any

depth desired and will handle any clearing work of from six to eighteen feet. Adjustable wings and center plow make the Phoenix suitable for both wide and narrow streets, roads and highways.

Write us today for additional information, prices, etc.

PHOENIX MANUFACTURING COMPANY

Dept. F9

Eau Claire, Wis.



**WATER TANK, BRIARCLIFF MANOR
VILLAGE WATERWORKS, N. Y.**

located, so they must consider other methods. The number of municipalities using elevated steel storage tanks in their water-supply systems is rapidly increasing, and engineers and paint experts are rapidly formulating the best methods of painting the structural steel supports and both the inside and the outside of the tank to check the ravages of corrosion.

The village of Briarcliff Manor, N. Y., is one of the many municipalities in this country which have taken advantage of hills and extended their height for water storage purposes through the use of elevated steel tanks. The tank shown above has a capacity of 100,000 gallons and is 140 feet high. It was built by the Chicago Bridge and Iron Works, Chicago, Ill., and is protected with Silica-Graphite paint furnished by the Joseph Dixon Crucible Company, Jersey City, N. J.

Locating Hidden Water Pipes

One of the trials of a water department is the locating of old mains, service taps, paved-over curb boxes, and leaks in the distribution system. The Vola Trading Corporation, 42 Broadway, New York City, sells a small instrument, known as the Transmit-O-Phone, which can be carried in the pocket and which has been found very successful in detecting hidden pipes, leaks, drains, ferrules, curb boxes and mains.

An instance of the use of this instrument in the case of a city main which entered somewhere near a house, the exact location of which was unknown, shows its value. The inspector went into the cellar of the last house connected to the main and placed the Transmit-

O-Phone on the exposed pipe. His helper tapped on the street with a crowbar over the supposed location of the city main, moving around, until as he came over the main the tapping was heard faintly. As he approached the ferrule the tapping was heard more distinctly. When the sound began to diminish, it was known that he had passed over the ferrule. He was then instructed to make a mark where he was tapping when the sound appeared most intense to the inspector in the cellar operating the Transmit-O-Phone. The process was then reversed by the helper's going into the cellar and tapping on the service pipe and the inspector's going out onto the street and placing the transmitter on the paving at the mark where the helper was when



**METHOD OF USING THE TRANSMIT-O-
PHONE IN LOCATING LEAKS IN WATER
LINES**

the tapping was most distinct. By this double check the inspector was able to locate the ferrule at the end of the city main within a minimum of time.

In searching for paved-over curb boxes the Transmit-O-Phone is placed on the exposed pipe in the cellar and the helper strikes on the sidewalk with a flat hammer. When he strikes directly over the curb box the sound is more distinct than when the tapping is merely over the service line. In this manner curb boxes which have been paved over or covered when lawns have been filled in are located readily.

New Seattle Office for Central Foundry

E. L. Keithley, son of the San Francisco representative of the Central Foundry Company, has joined his father at that territory and will cover Oregon, Washington, and neighboring states, including British Columbia. Keithley, Jr., has been until recently with the Seattle Plumbing Supply Company, and has just established an office at 1323 Alaska Building, Seattle, Wash.



The new WEHR Combination Road Planer and Grader

THIS combination road planer and grader for Fordson tractors is not a mere "road drag" or planer, but a **road maker**. The ideal machine for road patrol for county commissioners. With it the Fordson tractor is fitted for the toughest kind of road work.

With cutting edge below the power unit, and ahead of drive wheels, a **downward thrust** is secured. The draft is at the point the tractor manufacturers designed. This is what makes the Wehr do **perfect road work**—under conditions where the mere scraper or grader cannot get down to business. Write for complete information.

Look at photographic views, which show the Wehr planer and grader under the most adverse working conditions. The road was hard and dry. The ordinary drag—efficient only after a hard rain—would not have taken hold. Quickly attached with three bolts. **No holes to drill.** Write for information on the Wehr Snow Plow and the Wehr 2-Ton Trailer with dump body.

Write today to WEHR Company for full particulars of this new and remarkable grader. It is the machine you have wanted.

WEHR Company

(Formerly Andrew Mfg. Co.)

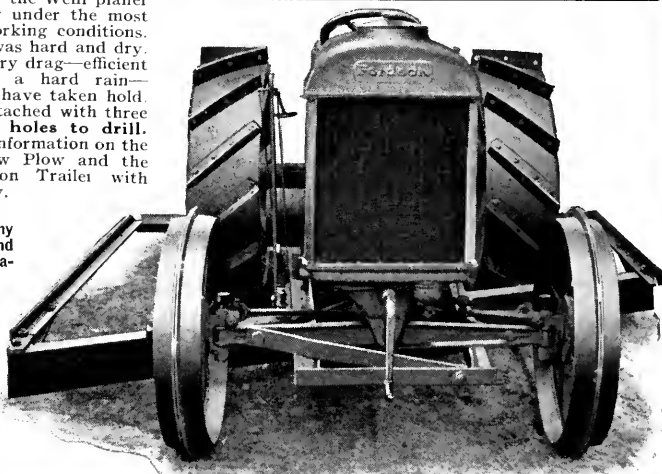
549 Thirtieth Street
MILWAUKEE, . . WIS.

Draft where it should be; cutting edge ahead of drive wheel. Utilizes entire weight of tractor.

Distributing bar delivers excess dirt (left in ridge) and a 4-in. shoe allows grade blade to deposit cuttings in low places.

Three-point toggle suspension gives absolutely independent movement; short turns, backing, easy to handle.

Five-inch clearance. Easy and perfect lever control. Write.





A METER BOX COVER

A New Type of Ring and Lid for Meter Boxes

The ring and lid illustrated herewith, made by the H. W. Clark Company, Mattoon, Ill., is adaptable to a number of different types of meter box body construction, namely, sheet iron, straight or corrugated, and concrete, straight or tapered. This AA-10-W Combination is made up of a cast iron ring and lid with the Clark Wonder lock. The box body is of corrugated galvanized iron. These combinations are furnished usually to measure 18 inches inside diameter and 18 inches high. They can be furnished, however, in any height desired.

Vacuum Street Cleaning and the Public Health

The man who sits in Lower 1 while the porter brushes all the rest of the passengers in the sleeping-car into the narrow passageway at the men's end of the car, coughs and swears and finally moves to get away from the dust and nuisance of the porter's broom. The personal insult of the porter's whisk-broom is a small affair in comparison with the constant danger to public health from the clouds of germ-laden and vermin-infected dust that follow in the wake of some of the old-time street cleaning devices.

The inventor of the Butler vacuum street sweeper has done for the public who traverse the sidewalks of modern cities what those who devised the vacuum cleaner for the home did for the dust-choked man of the house.

This street cleaning device made by the Butler Manufacturing Company, 1900 Euclid Building, Cleveland, Ohio, is a combination sweeping and suction machine built to clean the public streets in a sanitary manner. The operation of the machine is practically identical with that of the ordinary vacuum sweeper in the household. There is a rotary broom that picks up whatever dirt or dust or trash there is on the street and throws it into the hopper of the suction device or onto a conveyor that picks it up and distributes it into the several air-tight compartments of the machine.

The Butler sweeper is operated at a range of from two to ten miles per hour, depending on the condition of the street. It takes a

swathe 8½ feet wide. The operation is carried on with only the truck driver of the machine in charge. It has the distinct advantage of lending itself to use during the day, as well as at night, having no more effect on traffic than the passing of an ordinary large truck.

An interesting test of this machine was held on June 17, 1921, under the direction of the city officials of Cleveland. At this demonstration the machine picked up two tons of fine dirt, coarser dirt, wood, paper, tin cans and heavy material. Half a dozen paving bricks, four large glass bottles broken up, and several hundred ordinary pins were thrown under the machine, and all were gathered up without trouble. The test was witnessed by a great number of people, who were surprised and pleased with the machine. The following letter was sent by the Director of Law of the city of Cleveland to the manufacturers:

CITY OF CLEVELAND

Department of Law

Office of the Director

June 28, 1921.

The Butler Manufacturing Company,
The 1900 Euclid Building,
City.

Gentlemen:

Having witnessed a demonstration of the Butler vacuum street sweeper, I am much impressed with the efficiency of this machine.

The manufacturers of this apparatus seem to have successfully applied the principle of the ordinary home vacuum cleaner to a large machine for street cleaning. Because of the possibility of this cleaning large areas quickly, this machine should have a large field of usefulness in a modern city.

Very truly yours,

(Signed) WM. E. WOODS,
Director of Law.

Now the Frederick Snare Corporation

Announcement has been made of the change in name of the Snare & Triest Company to the Frederick Snare Corporation. The Snare & Triest Company was organized by Mr. Snare in 1899. During the years which have intervened this company has become recognized all over the world as not only one of the largest, but as one of the most efficient and reliable organizations engaged in construction work, its activities including over twelve hundred different jobs in the United States, Cuba, West Indies and South America.

Its work has included an unusually large amount of government and municipal work, including piers, bulkheads and pier sheds, breakwaters and jetties, bridges, reservoirs and pipe lines, power plants, dams, tunnels, sedimentation basins, etc. A later issue of THE AMERICAN CITY will contain an illustrated article by George A. Johnson, consulting engineer, New York City, relative to the 10 million-gallon reinforced concrete water distributing reservoir for the City of Perth Amboy, which is now under construction by the Frederick Snare Corporation.

The officers of the Frederick Snare Corporation are as follows: Frederick Snare, President; A. W. Bittenheim, First Vice-President; E. S. Skillin, Second Vice-President; Frederick Snare, Jr., Secretary and Treasurer,



Speaking of the Efficiency of Motorized Equipment

—this Mack tractor was purchased by the City of Akron to haul trailers carrying garbage to the Municipal Hog Feeding Grounds.

The tractor was bought with the specific understanding that it would haul three fully loaded trailers. In actual operation, however, it has been hauling six constantly and without any difficulty.

In the nine mile route covered by the tractor and its load there are several grades, one of which is 9%.

Regular and special Mack trucks and tractors are made to meet a wide range of municipal hauling requirements. The cooperation and unbiased advice of our Public Works Department are offered to municipal, township and county officials. Address Room 47

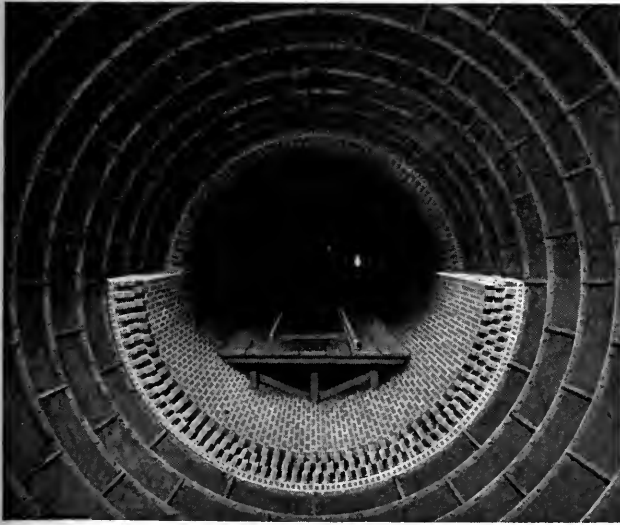
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York



Capacities—1½ to 7½ tons. Tractors to 15 tons.

"PERFORMANCE COUNTS"





TUNNEL LINER PLATES, SEVEN-MILE ROAD AND GRATIOT AVE. SEWERS, DETROIT, MICH. THE OUTSIDE DIAMETER OF THE SEWERS IS 12 FEET TO 13 FEET 8 INCHES

Tunnel Liner Plates for Sewer Construction

The modern method of tunnelling under ground is to use pressed steel liner plates to support the earth. The Truscon Steel Company, Youngstown, Ohio, has developed the Truscon tunnel liner plate, which consists of flanged sections bolted together, making a continuous rigid shell which can be carried forward a considerable distance in advance of the masonry. These plates are equally satisfactory used with either brick or concrete and make it easily possible to use removable steel forms for the inner surface of the tunnel.

Safety to workers is assured by providing this rigid steel lining. It is convenient and economical and effects considerable saving in shoring because of the small-sized sections and the rigid continuity secured by bolting them together. The entire construction is speeded up because of the simplicity in using the plates and the fact that tunnelers can keep in advance of the construction forces.

New Officers of Pittsburgh-Des Moines

E. W. Crellin, formerly President of the Pittsburgh-Des Moines Company, Pittsburgh, Pa., has resigned from active duty, and W. H. Jackson has been elected President in his place. The other officers who were elected at the same time are O. E. Guibert and W. W. Hendrix, Vice-Presidents, and George A. Smith, Secretary and Treasurer. Mr. Smith has removed from Des Moines to Pittsburgh, and A. C. Pearsall has been appointed General Manager of the Des Moines branch.

New Little Rock, Ark., and Baltimore, Md., Representatives

Yeomans Brothers Co., 1417 Dayton St., Chicago, Ill., manufacturers of centrifugal sewage ejectors, Shone pneumatic sewage ejectors and drainage pumps, have announced two new branch offices, one in Little Rock, Ark., in the Gazette Building, in charge of P. F. Fallon, and another in Baltimore, Md., at McComas and Race Streets, in charge of Morton McL. Dukehart & Co.

Providence Asks for Bids for Collection and Disposal of Garbage

The Board of Contract and Supply, Providence, R. I., has asked for bids for the collection and disposal of garbage for the city of Providence, bids to be opened September 12, 1921. The bids for disposal take into consideration feeding to swine, reduction process and incineration. The amount of garbage to be disposed of is estimated at from 60 to 100 tons average per day, varying considerably with the seasons. The collection of garbage with its disposal will be performed under the jurisdiction of the Department of Health of the City of Providence, whose control is absolute.

Bids for collection of garbage will be received in two forms, one based upon the contractor providing the entire equipment for collecting and secondly a bid will be received upon the collection of the garbage based upon the City of Providence providing the entire equipment, and turning the same over to the contractor for his use without expense to the contractor.

Collections of garbage must be made not less than twice each week from November 1 to May 1 and three times per week from May 1 to November 1. An alternate bid will also be received which contemplates daily collection from May 1 to November 1 and twice weekly from November 1 to May 1. The contractor is called upon to provide not less than 30 2-horse teams, each provided with wagon and tight steel tank, equipped with an adjustable cover of approved design and material. The tanks are to be readily removable from the running gear of the wagon.

Our Front Cover

The photograph of the recently completed storage reservoir at Newark, N. Y., which appears on this issue, was very kindly furnished by James P. Wells, Hydraulic Engineer, Cutler Building, Rochester, N. Y., who designed the storage reservoir and the entire new water works at Newark, N. Y.



Partial view of the famous asphalt lake on the Island of Trinidad.



GENASCO LINE

Trinidad Lake Asphalt
(For streets and roofs)
Standard Trinidad
Built-Up Roofing
Bermudez Road Asphalt
(For road building)
Genasco Roll Roofing
Genasco Sealbac Shingles
Genasco Latite Shingles
Genasco Vulcanite
Mastic Flooring
Genasco Acid-Proof Paint
Genasco Industrial Paint
Genasco Boiler Paint
Genasco Asphalt Putty
Genasco Asphalt
Pipe Coating
Genasco Asphalt
Fibre Coating
Genasco Tile Cement
Genasco Water-
proofing Asphalt
Genasco Waterproofing
Felts and Fabrics
Genasco Battery
Seal Compound
Genasco Mineral Rubber
Genasco Mineral Spirits
Genasco Base Oils
Genasco Flotation Oils
Genasco Motor Oils
Genasco Soluble Oils
Iroquois Road-building
Machinery

All good streets lead from Trinidad

In all parts of the world—wherever the art of modern street building is practiced—the finest and most heavily traveled highways are surfaced with TRINIDAD LAKE ASPHALT pavements.

There is a reason. Trinidad Lake Asphalt paving represents the greatest possible economy in both construction and maintenance. It is resilient, attractive, noiseless and will last for years with little or no need of repairs.

Trinidad Lake Asphalt is a native bitumen—a product created by nature and storm-beaten and sun-cured in the tropics for ages. Cold does not affect it. The sun does not cause it to become wavy or “bleed.” It defies both weather and wear to a greater degree than any other bituminous material known.

More than four million tons of this remarkable material have been used in street and road building since 1879. Think of it—enough to surface a roadway, eighteen feet wide, extending around the entire world.

Trinidad Lake Asphalt is also the foundation for numerous asphaltic protective products now included in the famous Genasco Line. Detailed information regarding any of these will be sent on request.

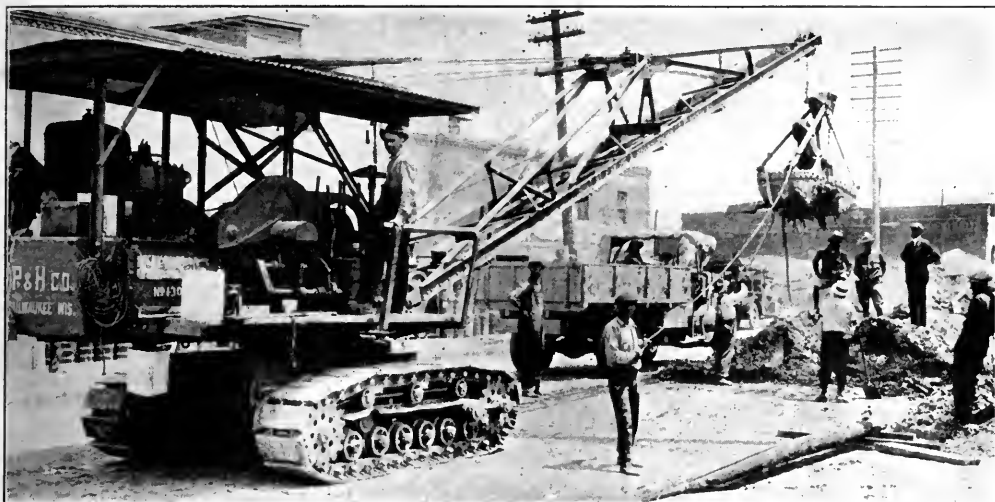
Before paying new streets or repaving old ones, it will pay to write for “The Asphalt Time-Table.” It is sent free.

New York
Chicago
Pittsburgh

THE BARBER ASPHALT
P A V I N G
COMPANY
PHILADELPHIA

St. Louis
Kansas City
San Francisco

TRINIDAD LAKE ASPHALT



CLEANING UP THE DEBRIS AFTER THE PUEBLO, COLO., FLOOD

A Big Help to Pueblo

Immediately upon hearing of the disaster at Pueblo, Colo., the Pawling & Harnischfeger Company, Milwaukee, Wis., decided to send one of its full-corduroy traction excavator cranes to assist in the relief work. The excavator was sent in a special car, and with the assistance of the railroad and the Pueblo city officials, no time was lost in transit.

The P. & H. machine was the first one on the job, and later two steam shovels appeared and together with 250 men formed the organization which cleaned up the city. The excavator was equipped with a clam-shell bucket, and the steam shovels with $\frac{3}{4}$ -yard dippers. The material to be removed consisted of mud, wagons, trees, telegraph poles, telegraph wires—or in other words, the most difficult material to handle and load by mechanical means.

The following letter was received by Pawling & Harnischfeger from Pueblo, Colo., expressing the appreciation of the city for its donation:

CITY OF PUEBLO, COLORADO.

June 22, 1921.

Pawling and Harnischfeger Company,
Milwaukee, Wisconsin.
Gentlemen:

The trench excavating crane so generously donated to our city for use in cleaning up debris, etc., is working on our streets and doing some wonderfully good work. *We estimate this machine is saving us three hundred dollars a day.*

This is by far the most valuable donation made to the city along that line and we appreciate your thoughtful attention to the matter very much indeed.

The confusion into which this disaster has thrown us accounts for our failure to acknowledge your kindness before.

Sincerely yours,

COUNCIL OF PUEBLO.

(Signed) By C. M. ROSE.

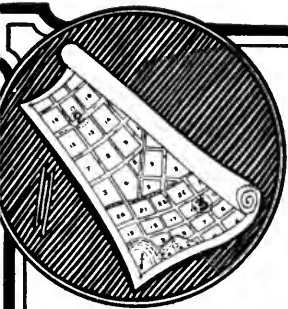
American-La France Secures Sales Rights for Sterling Sirens

The American-La France Fire Engine Co., Elmira, N. Y., has recently closed a contract with the Interstate Machine Products Company of Rochester, N. Y., whereby the former company will take over the sales rights of Sterling sirens. It is believed that this new combination will work out to the advantage of both companies, owing to the increased facilities for distribution which the American-La France Company, with its chain of branch offices, offers for Sterling sirens.

This siren is now giving satisfaction in hundreds of towns. The distinctive note which it produces warns the volunteer firemen in an unmistakable fashion, and brings them to their station with a minimum loss of time. These sirens are made in both single and double head types.

Financing Municipal and County Improvements

The United States Mortgage and Trust Company, 55 Cedar St., New York City, has been appointed fiscal agent for the payment of principal and interest of bond issues aggregating \$2,435,000, including Richmond, Va., \$1,000,000, Rock Hill, S. C., \$300,000, and Duval County, Fla., \$250,000. These issues and others aggregating \$9,228,000, including Camden, N. J., \$1,285,000, Plainfield, N. J., \$547,000, and Dallas, Texas, \$450,000, are being prepared and certified to by this company. Municipal and county officials who are considering bond issues will be very much interested in a booklet which this company publishes under the title "Municipal and Corporation Bonds."



How Valuable Are Your City Maps?

Though your City Maps may have cost thousands of dollars, they are of little real value unless they render adequate service to the interested municipal departments and the public. This service can best be rendered by making available accurate reproductions of these valuable records. Few City Authorities realize how cheaply these reproductions can be obtained by means of our improved processes. Nor do they realize how many people would purchase copies of these maps if such could be obtained at a reasonable price.

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Without cost or risk on your part we will send you a TRANSMIT-O-PHONE for 10 Days' trial on your own "troubles" in your own plant. If it doesn't do all and more, than we claim—return it at our expense. No obligation whatever on your part. Send for your TRANSMIT-O-PHONE Today, and you can

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Tool for Locating
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hidden pipes, drains,
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Transmit-O-Phone

MORE THAN 1600 IN USE

C. E. DAVIS, Chief Phila. Bureau Water,
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assistance finding underground leaks and
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stand the stress and strain of the hardest sort of work. Their hickory rods, tough, light, and strong, last without splintering, slivering or warping. Can be turned in either direction without unlocking.

Write today for illustrated
catalog.

Waldo Bros. & Bond Co.

*Building Materials and Construction
Equipment*

181-W Congress Street, Boston, Mass.

The All-Year-Round Service of Medium Size Tractors

Town, county and city engineers are becoming quite convinced that the medium size tractor is the most useful machine for road maintenance work both winter and summer. In the past, especially in small cities, nothing was done to remove snow from the highways, but with the heavy truck traffic it became absolutely essential that highways be kept open, and for that reason even many interstate roads are plowed out so that large trucks can operate from city to city without delay. Furthermore, the removal of snow from the highway itself prevents the melting snow from damaging it.

In large cities, like New York, snow removal

ments which have such obstructions as man-hole covers, street car tracks, etc., to contend with and where the traffic is heavy and operations must be conducted through the traffic. Furthermore, almost every town has a number of road graders and if they can be used the year round it makes a very efficient proposition.

Other types of plows are used which are adapted to the peculiar conditions of the case. In very deep snow it is hardly advisable to use a road grader. In some places snow rollers are used, although this method of winter road maintenance is rapidly disappearing, owing to the great increase in the use of motor trucks. The pusher plow is very frequently installed on the front of the tractor for rapid handling



TACKLING A HEAVY SNOWFALL TO OPEN UP THE ROAD

has always presented a large problem to the officials. New York City now probably has the best snow fighting equipment in the world. One hundred Cletracs, made by the Cleveland Tractor Company, Cleveland, Ohio, are included in this equipment and the work done by them in the snow last winter proved their adaptability for this kind of work.

Many smaller cities and towns use Cletracs, not only in the winter for snow removal, but the rest of the year for maintaining such dirt roads as they still have. Among these towns and cities are Montclair, N. J., Springfield, Mass., Barre, Vt., Bethel, Vt., Adams, Mass., and many others. These towns consider the tractor an essential part of their snow fighting equipment.

The plows used behind the Cletrac for snow removal vary in different localities, depending upon the work to be done. The most common plow is merely an ordinary road grader equipped with a large blade, flanged rear wheels and balanced so that it will handle the snow in large quantities and not slip. This makes an excellent tool for use over pave-

of the snow as illustrated herewith. The Cletrac, when equipped for snow fighting, is equipped with a special track which contains lugs or cleats which give it traction on snow and ice. In some places, for example, New York City, cabs have been placed on the tractor, so that the drivers are protected from the weather.

There is hardly a town of any size which does not have some road maintenance work to handle. Some towns do but little work, but they are finding that it is really a profitable investment to keep highways in good condition for traffic at all times of the year. In the spring of the year there are gutters to be opened and roads to be crowned up. Later on, there are improvements to be made on the highways, and the Cletrac is well fitted to pull a rooter plow through macadam and in that way take the place of a scarifier or a steam roller. If it is necessary to move curbing, these heavy slabs of stone may be moved easily. It can also be used to replace horses for pulling a sprinkling cart or road oiler,

Culvert:—

An artificial channel for carrying a small stream underneath a canal or the embankment of a roadway or railway.

—*The Americana*

AND

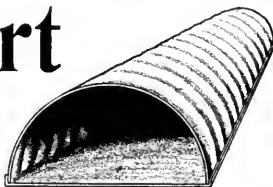
What an important part the culvert plays in protecting and holding up the embankment.

In all the years that Newport culverts have been made, there has never been a complaint regarding unsatisfactory and defective service. That means that thousands of drainage openings through embankments on railroads and highways have been lined with Newport culverts which have stood the wear of weather, the heavy loads of motor trucks and locomotives and have furnished clear waterways for freshets and floods, protecting the embankments from washing.

The next time you need culverts buy Newport Corrugated Iron Culverts and thereby make a permanent, paying investment.

Newport

542 W. 10th ST.



Culvert Co.

NEWPORT, KENTUCKY



THE TYPE OF FOUR-WHEEL TRACTOR-DRAWN HOOK AND LADDER NEW YORK CITY HAS RECENTLY ORDERED

Contract for Aerial Hook and Ladder Trucks

The New York Fire Department recently awarded a contract for ten four-wheel, tractor-drawn aerial hook and ladder trucks to the International Motor Company, New York City. In the past New York has purchased only front-wheel-drive apparatus for this service. There has always been a difference of opinion regarding the type of tractor best adapted to long trailing apparatus, so that in asking for bids at this time, New York advertised for bids both on two-wheel and four-wheel tractors.

It is claimed that the four-wheel tractor with semi-trailer offers greater flexibility of operation than would ordinarily be expected of a vehicle of such great length. This is made possible by the fact that the front end of the trailer is mounted upon a wagon-type of fifth wheel, which rests on the tractor's rear end or driving axle. This fifth wheel functions exactly the same as the fifth wheel of a horse-drawn wagon, and the combination of tractor and semi-trailer fold on the king pin when turning. The vehicle can thus be turned completely around without the trailing wheels moving out of a 10-foot circle. Another favorable feature of the four-wheel tractor is the accessibility of its power-plant and driving mechanism, for it is built like a short-wheel-base truck.

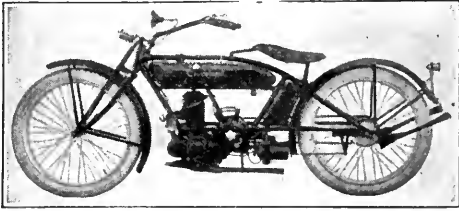
The Use of Calcium Chloride on Roads

Many highway superintendents do not realize the value of calcium chloride in road work.

Calcium chloride is a clean, white chemical salt with the peculiar property of attracting moisture to itself. It quickly dissolves when exposed to the air and readily combines with the surface to which it is applied. It is odorless and harmless, does not track or stain, and is without effect on rubber, horse-hoofs, or clothing. Because of its property of absorbing moisture from the atmosphere, it is a natural dust-layer. It is a good surface road-binder, and when applied it soon becomes incorporated with the top course and retains sufficient moisture to lay the dust and keep the surface in a smooth, slightly damp, compact condition. In practice, calcium chloride absorbs the moisture during the night and will dry out somewhat during the day, but as it renews its moisture content each night the process is continuous, thereby maintaining a dustless, smooth-surfaced road at all times. It also acts as a weed deterrent.

The Semet-Solvay Company, Syracuse, N. Y., manufactures calcium chloride in four forms—liquid, solid, granulated, and flakes. For road work, particularly, the granulated or flaked form is employed. It is shipped in air-tight sealed drums, containing 350 pounds net. The material is ready to apply upon opening the drum.

One of the advantages of flaked or granulated calcium chloride is that it may be applied by unskilled labor. It may be spread quickly and easily with ordinary shovels to cover small surfaces, and by horse-drawn or motor-drawn spreaders when the surface to be covered is large in extent. To obtain the best results, it is essential that there be an even distribution of material. The surface of the road to be treated should, if necessary, be put in shape



For Park Patrolling— Cleveland Motorcycles

The Cleveland Motorcycle is practical for the use of officers assigned to the patrolling of public parks. It is light weight and is therefore very easily handled and controlled, and is very economical of upkeep.

The Cleveland travels 75 miles to the gallon of gasoline and 12,000 to 15,000 miles on one set of tires.

It has a simple, positive, dependable two-stroke motor—no valves to cause trouble. A few cents a day will keep a Cleveland Motorcycle in service.

A few minutes of explanation of the controls and a novice rides the Cleveland with confidence and safety. It is as easy to ride as a bicycle.

Write for information (Catalog "C") on the Cleveland. Have the data ready in your files for reference when the need for motorcycles arises.

Price of the 1922 Cleveland
\$225

Electric Lighting Equipment
\$35 extra

MOTOR CYCLE Cleveland

7th Year

**CLEVELAND MOTORCYCLE
MANUFACTURING CO.,
Cleveland, U. S. A.**



Steel FLAG Poles

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*Write for Catalogue showing
Ground Set,
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17-200 ft. high.*

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Murray St.,
NEWARK, N. J.**



THE CALIFORNIA BENCHES

Patented 1913-1914-1916-1917-1921-and pending

These benches are a high class finished product, the above being one of seven refined designs originated by us. The seat and back are of two by four clear wood properly finished and fastened through the concrete ends with wooden wedge pins.

In order that Park Boards and individuals may now obtain this fine product at commercial prices everywhere, we have arranged that local concrete products manufacturers in various districts of the country may obtain the Patent Rights and the perfected iron molding machines for same at reasonable cost.

Hundreds of these benches are in use by the Cities, Parks, Resorts and Universities, famous upon the Pacific Coast, and their utmost utility, permanence, and attractiveness appeals to all.

Your valued inquiry might include name of a local firm, or we will endeavor to establish its manufacture through your Chamber of Commerce or advise you nearest factory.

ART CONCRETE WORKS

Originators and manufacturers for 35 years.
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TYPE OF SEALED DRUMS IN WHICH FLAKED AND GRANULATED CALCIUM CHLORIDE IS SHIPPED

previous to the application of the calcium chloride. Under ordinary conditions about $1\frac{1}{2}$ to $2\frac{1}{4}$ pounds of material per square yard are necessary for the first application, which should be followed by a second treatment later in the season. The interval between applications depends upon the quality and condition of the surface of the road and the character and volume of traffic. Under modern traffic a good surface should not require more than two applications per year, while under heavy traffic three may be necessary.

A Tee Stand for Municipal Golf Courses

The tee stand illustrated below has been developed by the Worthington Mower Company, Shawnee-on-Delaware, Pa., and is claimed to be a distinct improvement over those in general use. It is neat in appearance, easily moved to convenient location on the tee, is made entirely of iron, therefore strong and durable, and is inexpensive.

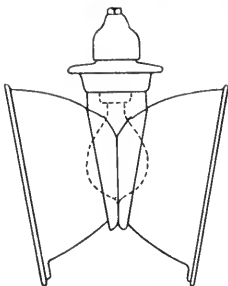
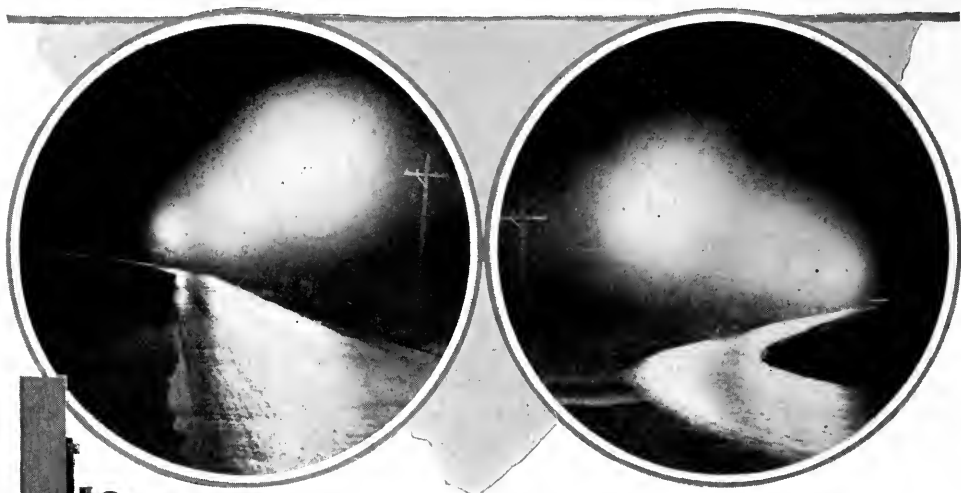
The sand in the lower pail is moistened with water from the upper one without wetting the hands or causing any splash. On the pails may be painted the hole distances and numbers. These stands have been in use for many years on private and public golf courses, and in no instance have they been displaced by another form.

The stand is fitted with a golf ball cleaner, a patented design that solves the ball-cleaning problem. In effectiveness, convenience and simplicity, it is probably without equal. It is mounted on an iron frame, and fits any wood or iron sand box. No sand is used in the cleaning process. No scouring of the paint on the ball takes place, no grit gets on the hands or grip. It cleans very rapidly and thoroughly.



A WELL-BUILT GOLF TEE STAND FOR MUNICIPAL AND PRIVATE COURSES

Highway illumination which lessens headlight glare and shows up the road behind an approaching car is a safety factor not to be neglected.



This fixture with three nested reflectors is the secret of good highway lighting.

Country roads can be made as safe as city streets

From the illuminating engineering laboratories of the General Electric Company has come a new system of rural highway lighting—one that keeps the light on the road, not on the fields or in drivers' eyes.

In each unit, a single lamp with three nested reflectors throws the light downward and along the road. Spacing of 600 feet and lamps as small as 250 candle power (155 watts) give satisfactory service with high economy.

G-E street lighting specialists at all of our district offices will be glad to furnish further information.

35c-78

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities



TWO TEAMS HANDLING A PHOENIX SNOW PLOW

Clean Streets and Pavements for Next Winter

City, county and township officials along in the early fall begin to seriously consider the necessity of investing money in snow plows in order that the streets and walks in their districts may be clear of snow during the winter. A county in the western part of Wisconsin made a survey of automobiles, trucks and tractors used among the townsmen and farmers. The figures showed a total of more than \$1,000,000 worth of automotive equipment, less than the total for an average country town. One day in the dead of winter after a week's snow blockade the local newspaper appeared with a discussion head "A Million Dollars Idle." The editor figured that the interest on the money invested in the automobiles, trucks and tractors amounted to \$60,000 a year. When the roads were blocked to these machines he held that it was costing the owners just a few cents less than \$165 every day, costing it because these machines were absolutely useless. The remedy for this is the use of a well-built

snow plow which can readily open up the roads for winter traffic.

The Phoenix snow plow built by the Phoenix Manufacturing Co., Eau Claire, Wis., has a number of points which make it of particular interest to municipal officials. It is so arranged that it is possible to put one or more teams of horses in front of the snow plow and two teams behind. Also a tractor can be attached in front in place of the team and make a quick job of cleaning up the heaviest snow fall. There are three hand wheels on the plow, which make it possible to raise and lower the plow itself to any desired depth. The wings are adjustable by heavy forged extension arms and are held in place by coupling pins. The plow is built throughout of well-seasoned Wisconsin oak with all of the exposed parts, such as the runners and plow board, protected with highly tempered steel. Heavy forgings and castings are used to secure the whole structure and to make the Phoenix snow plow a well-built, dependable piece of snow removal machinery.



WORKING IN DEEP SNOW

On the Calendar of Conventions

SEPTEMBER 13-15.—DETROIT, MICH.

Association of American Cemetery Superintendents. Annual meeting. Secretary, W. B. Jones, Highwood Cemetery, Pittsburgh, Pa.

SEPTEMBER 13-16.—BRIDGEPORT, CONN.

New England Water Works Association. Annual convention. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston, Mass.

SEPTEMBER 26-30.—BOSTON, MASS.

National Safety Council. Annual safety congress. Secretary, S. J. Williams, 168 North Michigan Avenue, Chicago, Ill.

SEPTEMBER 27-30.—SANTA MONICA, CALIF.

League of California Municipalities. Annual convention. Secretary, H. A. Mason, care Board of Supervisors, San Francisco, Calif.

SEPTEMBER 29-OCTOBER 1.—HARRISBURG, PA.

Pennsylvania State Association of County Commissioners. Annual convention. Secretary, L. C. Norris, Clearfield, Pa.

OCTOBER 11-14.—SEATTLE, WASH.

American Association of Port Authorities. Annual meeting. Secretary, M. P. Fennell, Jr., 57 Common Street, Montreal, Canada.

OCTOBER 11-14.—ATLANTA, GA.

International Association of Fire Engineers. Annual convention. Secretary, James J. Mulcahey, City Hall, Yonkers, N. Y.

OCTOBER 12-14.—LAWRENCE, KANS.

League of Kansas Municipalities. Annual convention. Secretary, John G. Stutz, University of Kansas, Lawrence, Kans.

OCTOBER 20-21.—COLUMBUS, OHIO.

Ohio State Conference on City Planning. Annual conference. Secretary-Treasurer, Charlotte Rumbold, 201 Chamber of Commerce Building, Cleveland, Ohio.

OCTOBER 24-28.—BALTIMORE, MD.

American Society for Municipal Improvements. Annual convention. Secretary, Charles Carroll Brown, 404 Lincoln Avenue, Valparaiso, Ind.

OCTOBER 27-NOVEMBER 3.—JACKSONVILLE, FLA.

American Prison Association. Annual congress. General Secretary, O. F. Lewis, 135 E. 15th Street, New York, N. Y.

NOVEMBER 14-18.—NEW YORK, N. Y.

American Public Health Association. Annual meeting. Secretary, A. W. Hedrich, 370 Seventh Avenue, New York, N. Y.



Alba Installation, Gary, Indiana

Ornamental Street Lighting with Alba Globes

is profitable municipal investment.

It increases property values by making a city more attractive to live in and by drawing trade. It costs no more than old fashioned, inefficient, unattractive lighting.

Alba is the best glass for all lighting uses. It diffuses the greatest quantity of usable light—absorbs least—and makes illumination uniform and agreeable.

Street Lighting Suggestions

City officials, civic organizations and any one else who is interested in good Street Lighting can secure information and literature upon request to our Street Lighting Department.



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VOLUME XXV

NUMBER 4

The American City

NEW YORK

OCTOBER,

1921

Immediate Enlarged Activities in Public Works Construction Will Help Solve This Problem

FOR millions of men in America to-day, unemployment is a tragic reality. To the mental suffering of the man out of a job is being added an increasing measure of physical suffering for himself and his family.

Business in many cities is improving, but not fast enough to remove the necessity for immediate public action.

Unless there is a job for every able-bodied man in your city who is willing to work, the problem is *your* problem. In this land of plenty, society cannot dodge the responsibility for relief to those who are in need as a result of involuntary idleness. Soup kitchens are preferable to starvation; but what the man worthy of relief really wants is not charity but self-respecting work.

The city that supports able-bodied men in idleness is losing the things these men might produce.

Does any city exist which has everything it needs in housing facilities, paved streets, water-supply, sewers, fire stations and apparatus, street lighting, parks and playgrounds? Stimulate such activities to the utmost through private initiative or public action, and you will go far toward solving the problem of the man out of a job; you will not only furnish work for many of your own citizens, but will help speed up the wheels of industry throughout America.

Short-sighted in the extreme would be a policy of retrenchment in expenditures for needed public works at this time. Real economy and humanity both demand that the unemployed be given work.

It is within the power of your local leadership to speed the transformation of stagnation into prosperity for merchants and manufacturers; the transformation of despair into hope for the unemployed; the transformation of a city which is waiting for something to happen into one that is *causing* things to happen.

Is your city drifting—or acting?

The Topographic Map in City Planning Part I

By Jefferson C. Grinnalds

Assistant Engineer, Topographical Survey Commission, City Plan Committee of
Baltimore, Md.

IT is a settled fact that a map of a city on which to study and lay out a plan for any proposed extension of the street system is necessary. It is a requisite, too, for replanning old parts of the city, or systematically studying traffic conditions, for showing offsets that break the continuity of streets, and indicating bad angles, block distances, dead end streets, as well as inadequate widths and inefficient functioning of existing thoroughfares. A map of some kind on which to lay out a major street plan is absolutely necessary; and since zoning is an essential part of city planning, its requirements must be supplied. Maps are indispensable for a zone plan—indeed, they are a part of it. There are many other reasons why a map of a city is necessary in planning.

If it may be accepted as a condition precedent to studies for drawing a city plan, that some kind of diagram of the present layout is necessary, then the kind of maps must be determined. Suppose those at hand are similar to the common, well-known automobile maps, which show merely street alignment depicted to a scale of approximately 2,000 feet to one inch or 1,000 feet to one inch. Of what service would a map of this kind be? If it were noticed that there were in some place two parallel streets which ran thus for, say, one thousand or more feet without a connecting cross street, the city planner might say, "Why not open between these two parallel streets a cross-town street which is dead ended on opposite sides

of this long, unbroken block?" He can see from inspection of the diagram what seems to be a desirable opening. It is not apparent from such meagre information that the grade on the proposed connection would be as heavy as 10 per cent. Why? Because there were no elevations given nor were there contours showing approximately the probable grade. Imagine another problem that must be solved. Several parallel streets are shown on this diagrammatic map, crossing a rail-

road yard which lies contiguous to a railroad main line. There is no indication to guide the engineer in his diagnosis of the kinds of crossings over the tracks. Are they at grade, are they elevated above the tracks, or are they depressed below the tracks? If such crossings as exist are dangerous, what is the remedy? He cannot tell positively with no more facts to help the solution. If he had a contour map which showed the relative loca-

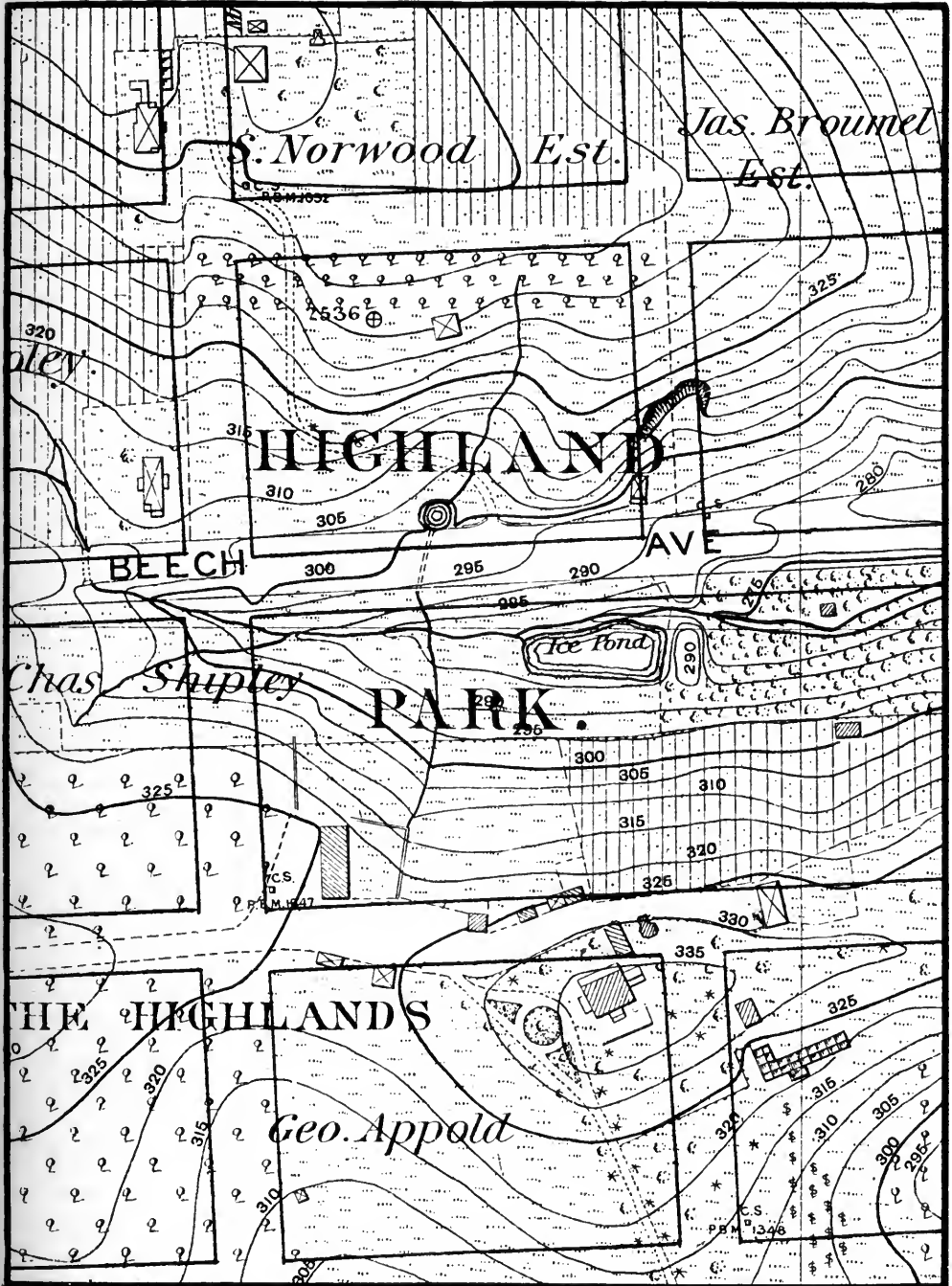
tions to scale, he would know at once the conditions on the ground and where to look to find the railroad, in a cut or on a fill, where the streets could cross overhead or underneath respectively. In one or both places he would advocate a bridge.

What the Map Should Show

From the foregoing it seems that a map is necessary, and, further, that it should be a topographic map. Assuming that to be a correct conclusion, the next step is to determine what the map should show. The first consideration is the existing street lay-

Planning a City Blindfolded

Why all this elaborate, detailed description of a map, and what is the excuse for making it? Cities used to be laid out without one, it is true. What kind of layout was it? Well, when a street was designed to be a straight street, it was so drawn on paper, so built on the ground and, regardless of hills or ravines, it kept on. The cost heaped up for cuts and fills and bridges. If the way led to a railroad, it passed over at grade, more than likely, leaving a heritage of danger for several generations, ultimately saddling the taxpayers with the burden of expenditure to eliminate at considerable cost the death-trap.



A SECTION OF STREET 2N-4W TOPOGRAPHICAL SURVEY OF THE CITY OF BALTIMORE, MD.

The original map from which this illustration was made shows the contours in brown, and streams, lakes and ponds in blue. The full-size scale of 1 inch equals 200 feet has been retained in this reproduction, showing the proper scale for city planning maps of this type. The street system which was planned and which has now become a reality is superimposed on the topographical map. From the contours it is possible to readily figure the grade of any street and to roughly estimate the cut and fill to maintain a uniform grade between any two intersections

out. All streets that are built up or marked on the ground should be recorded by the field survey parties and plotted on the map. The office force should be employed at the same time compiling all the data accessible for platted parcels of land. Many such subdivisions have been laid out on paper with no streets having been staked off on the ground. All plats on record or of which any information can be obtained should be located on the field sheets when they come in. Improvements such as buildings of all kinds ought to be located on the field maps, including railroads, street railway lines, streams, shore line, lakes, reservoirs, retaining walls, dams, bridges, quarries and wooded areas. Fences and their character, such as wire, paling, rail, and old fence lines, hedges and rows of trees that might indicate old property lines, are requisite to a good map. The state of cultivation is desirable, differentiating by suitable standard signs, orchards, meadows, plowed land, corn fields, pine woods, etc. Lastly, contours must be located and plotted.

The Scale and Contour Interval

Having decided what physical features are to be shown on the topographic map, it is necessary to determine the scale and contour interval. The former ought to be one which is readily plotted in the field on a field drawing table. When it is remembered that rows of brick houses are to be shown, it is not practical to draw them at a scale less than about 200 feet to one inch. To be able to scale within a foot or two, the width of a street or sidewalk, the above-mentioned scale is almost the minimum. The well-known map of Baltimore, made by the Topographical Survey Commission of that city in 1894, is a masterpiece of that kind of work. It is drawn to a scale of 200 feet to one inch, with a contour interval of five feet. It was found to be admirably suited as a base for working out a plan for streets in the hitherto unplanned territory within the city. The contour interval of five feet seems to be right for street design and determination of grades. It may be that over very flat terrain a lesser interval may be necessary for sewer design and to a less degree for water-main locations.

Accuracy Essential

Here it is well to decide how good the

map must be from the point of view of accuracy. It should be based on a primary triangulation system, the stations of which may be regarded as nearly permanent and accurate to within five to ten seconds for closure of any quadrilateral. The secondary and tertiary stations should be almost as good as the primary. There ought to be one or two accurately measured base lines, corrected for curvature. On the triangulation there should be run out all the main roads and cross-country, and a traverse control with a maximum error of one in ten or fifteen thousand. Traverse points should be iron rods or pipes placed in the most protected places along highways or in open country, or copper bolts set in curbs or on sidewalks, all well referenced for future use. A net of precise levels ought to be spread over the area to be mapped, and bench marks placed on the most permanent structures at about half-mile intervals. Wye levels can be run to traverse points and temporary stadia stations. Maximum error for precise levels should be not over about three-sixteenths of an inch to the mile.

Maps Prevent Errors in City Planning

Why all this elaborate, detailed description of a map, and what is the excuse for making it? Cities used to be laid out without one, it is true. What kind of layout was it? Well, when a street was designed to be a straight street, it was so drawn on paper, so built on the ground and, regardless of hills or ravines, it kept on. The cost heaped up for cuts and fills and bridges. If the way led to a railroad, it passed over at grade, more than likely, leaving a heritage of danger for several generations, ultimately saddling the taxpayers with the burden of expenditure to eliminate at considerable cost the death-trap. Had a map been available showing by contours the existing hills, valleys, streams, railroads, etc., it is probable that the entire street plan would have been different. When a large city of to-day was in the village or town stage, its whole scheme of streets would have been designed to fit the topography, had proper maps been made. The present small town should benefit by the costly lessons that the large ones have learned too late to greatly alter the down-town sections without prohibitive cost.

The Steel Storage Tank Solves Water-Works Problems

By Clinton M. Ladd

Contracting Engineer, Chicago Bridge & Iron Works

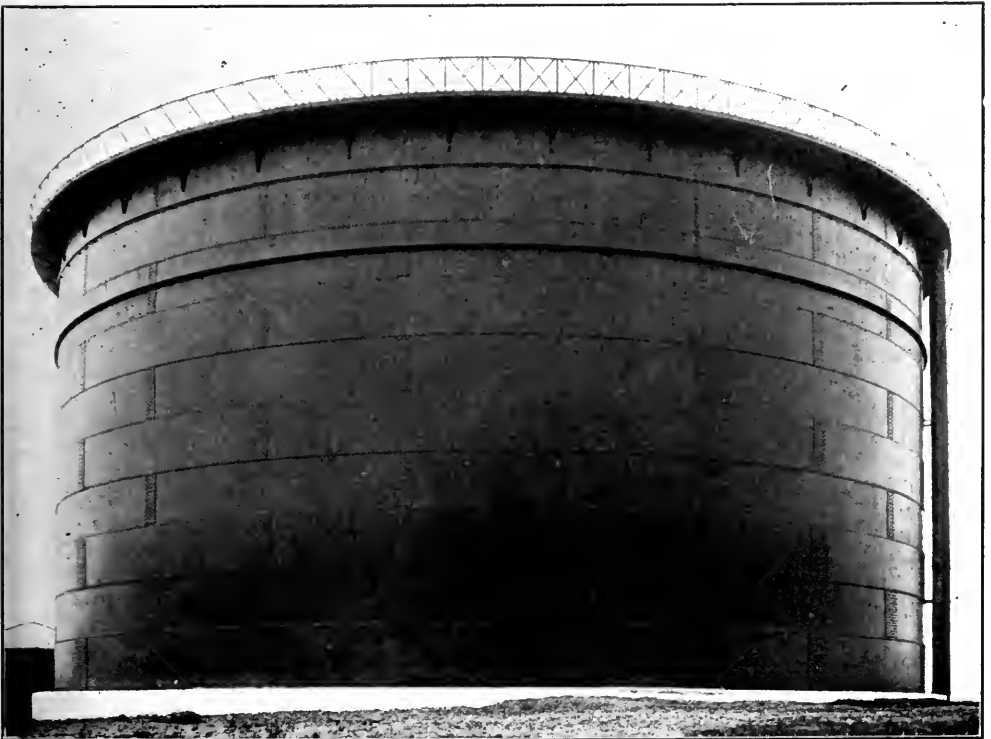
ALTHOUGH the value of the steel storage tank, elevated on a tower or not, to the water-supply systems of the smaller municipalities has been recognized for a great many years, the larger towns and cities that are required to operate pumps 24 hours each day have only of late years begun to realize the value and importance of such tanks as a means of reducing operating costs and securing better distribution of the water throughout the system.

By the placing of tanks at one or more points in a city that has increased in population and water requirements it is often possible to avoid the addition of new power and pumping equipment; and in many cases the expense, annoyance and loss occasioned by the removal of existing mains and

replacing with larger ones is eliminated.

As the population of cities which obtain their water from deep wells increases, the demand for water increases until the pumps or wells will not furnish the water required during the peak load period, which is about 10 hours of each 24, but during the remaining 14 hours the pumps and wells can produce more than is demanded. Having no place to store this excess water, the speed of the pumps is reduced and in some instances one or more shut down. The next day the water officials are confronted with the same old problem—inability to meet the maximum demand.

The solution is often to equip the system with one or more tanks placed in widely separated portions of the city and at con-



STEEL FLAT-BOTTOM TANK 50 FEET HIGH AND 100 FEET IN DIAMETER, CAPACITY 2,938,000 GALLONS, A PART OF THE YOUNGSTOWN, OHIO, WATER-WORKS SYSTEM

siderable distance from the pumping station, into which water can be pumped during the off-peak hours and stored against the hours of heavy demand. By this method expenditures for additional well and pumping equipment may be eliminated, and still an ample supply is provided to meet all demands. This procedure in many instances has made it unnecessary to increase the size of the main feeder pipes, for a layout as above described permits the drawing of water from two or more sources of supply instead of one, as in the case of a direct pressure system.

The tank is of real value in the water system of a level city as well as of a hilly one. In some of the larger cities that have considerable range in elevation in the various sections the steel tank has been found the only economical means of insuring proper water-supply to all. Some cities could not serve all the people with their present pumping and distributing equipment except by the use of storage tanks.

Cincinnati, Ohio, has three batteries of tanks with a total capacity of about 10,000,000 gallons located on the high hills in the suburbs. Dayton, Ohio, has two such installations and a program calling for two more. Kansas City, Mo., has begun by installing one. Seattle, Wash., has three or more; Portland, Ore., one; and Akron and Youngstown, Ohio, respectively two and one.

Elgin, Ill., a city built both in the valley and on the highlands, operated for a great many years with a small tank attached to the mains. Through some accident it was destroyed and the plant was operated by direct pressure, pumping water directly into the mains. The authorities soon discovered that this small tank had been of great value in holding down operating and maintenance costs, for after the disaster which destroyed the tank the operating costs increased to such an extent that the water department was actually incurring an operating deficit. The city then bought and installed a 500,000-gallon tank on a steel tower, and since that time the operating costs have taken a very decided drop.

The records of the Washington Heights pumping station of the city of Chicago give actual figures on the relative cost of the direct pressure system and the storage tank method.

During 1899 and a part of 1900 a wooden



AN ELIPTICAL-BOTTOM TANK, CAPACITY 500,000 GALLONS, ELEVATED 65 FEET

tank was used at this station. This tank leaked badly and finally burst early in the latter year. It is interesting to note how the cost of pumping immediately doubled. A second wooden tank burst two days after it was filled for the first time, but finally, in January, 1902, a steel tank was put into service. In that year the cost of pumping dropped to about one-third of the cost for 1901, which shows the value of having a uniform pressure on the mains.

Years	Million Gallons Pumped	Billion Foot Pounds	Total Cost of Fuel	Cost per Billion Foot Pounds
1899..	107.7	98	\$1,453	\$14.82 pumping into tank
1900..	118.2	100	2,345	23.45 pumping direct
1901..	139.1	94	2,852	30.50 pumping direct
1902..	157.2	187	2,028	10.84 pumping into tank
1903..	243.7	290	2,508	8.65 pumping into tank

It should be noted that the above figures give the fuel saving alone. The saving in wear and tear on the machinery and the mains is inestimable, for when pumping direct, the unequal pressure is hard on the pumps and often results in a break-down at the critical moment. These figures, from

an entirely reliable source of information, are worthy of serious notice.

In level country we find installations of steel tanks in such cities as Miles City, Mont.; Appleton, Wis.; Wellington, Kans.; Moberly, Mo.; Stratford, Ontario; Kelchner, Ontario; and a contemplated installation at Hammond, Ind. We also find cities that are more or less rolling in their contour which have found it profitable to install tanks, such as St. Paul, Rock Island and East Moline. These successful installa-

tions indicate the wide adaptability of the storage reservoir of steel and the elevated tank of the same materials.

It is possible that in many cities it will be found profitable to give a more careful study to the storage tank in its relation to water systems. If the problems are high hills, low valleys, shortage of water, insufficient pumping equipment or mains that appear to be too small for their maximum demand, the steel water tank is a probable solution and should be given very serious consideration.

Selecting an Engineer

By Joel DeWitt Justin

Consulting Engineer, North Carolina State Board of Health

EVERY year millions of dollars are wasted on poorly planned and poorly executed public works; water-works and sewers are built that do not function, dams fail and go down-stream or are built for the generation of hydro-electric power, only to discover that the stream-flow is insufficient; roads are built with the proceeds of 50-year bond issues and go to pieces in two or three seasons.

Some of this terrific waste takes place in connection with the construction of projects privately financed, but by far the greater part of this orgy of useless spending is from the public purse—a burden borne directly by the taxpayers. Graft is much more rare than many appear to think, but wilful inefficiency is just as inexcusable and far more common. Much of the money expended on public works to-day is spent to correct the bungling and blundering of yesterday.

All of this waste and extravagance is traceable to one primary cause—the failure on the part of those elected or appointed to positions of public trust to secure and retain in complete charge of the investigation, design and construction of all engineering

projects only the most competent engineers.

The success of the great modern corporations is in a very large measure due to their reliance on the excellent engineering organizations which they have built up. Very occasionally the greatest of engineers make serious mistakes, but in 99 per cent of the cases the failure or partial failure is due to having no engineering or incompetent engineering. Many projects, involving dams, water-works, street paving, sewage disposal, etc., might be cited, in connection with whose design and construction no engineer at all was engaged. All of them were either physical or economic failures or both.

Therefore, the whole problem, if you wish to see your public works so executed that they will not have to be done all over again in a few years, and the money now spent not wasted, is to see that you secure only the most competent engineering services. If such a course had been pursued in the past by our public officials, municipal, state and national tax rates would now be much lower than they actually are.

A Call to Action on Unemployment

The problem of unemployment calls for instant and energetic action. Cities, counties and states should start at once the making of road repairs, building reservoirs and other public work.

Much construction or repair is in heavy arrears on account of the interruption of the war, and now is the time to have it done.

A double need will be met. The public will be served and the idle given tasks to do and money to earn.

For lack of courage we are neglecting any number of large undertakings that would give a mighty shove to the great stalled engine of American production.

—James J. Davis, Secretary of Labor.

The Power-Plant of the Catskill, N. Y., Water-Supply

Interesting Developments in Improving Power-Plants and Pumping Stations

By John F. Barnard

Superintendent, Board of Water Commissioners, Catskill, N. Y.

THE Catskill water-works, owned by the village of Catskill, N. Y., came into existence in 1883. The entire system is under the immediate control of the Board of Water Commissioners, consisting of five members, one appointed by the Board of Trustees each year, to serve for a term of five years. These commissioners serve without compensation and give much valuable time and energy to the welfare of the plant and the village.

The pumping station is situated on the banks of the Hudson River, one mile above the Catskill Landing. The water intake structure itself consists of a concrete chamber 3 feet square set just inside the dock. A 20-inch pipe leads from the intake chamber to a suction well under the pump-house. Water flows by gravity to the suction well, from which it is forced by two Davidson tandem compound duplex double-acting steam pumps with 10-inch discharge to the reservoir. From the reservoir the water flows by gravity to a distributing system, consisting of 16 miles of mains, ranging from 4 to 12 inches in diameter. The pressure in the village varies from 40 to 100 pounds per square inch.

Pumping Station Equipment

The equipment of the pumping station, in addition to the two steam boilers and two Davidson pumps, was supplemented last year by a "J. R. S." blower system, run by a 10-horse-power steam engine, and a Wallace & Tiernan chlorinator in duplicate to replace the small hypochlorite plant which was formerly used to sterilize the water.

The installation of the blower system has effected a great economy in the operation of the plant, as, even with the increased cost of coal, it has made it possible to operate the plant at about the same cost as in previous years. The following table shows the comparative cost of operating the pumping station from 1917 to 1921:

Year	
1917-1918.....	\$10,021.42
1918-1919.....	12,294.90
1919-1920.....	11,174.01
1920-1921.....	11,620.93

Comparing one day's record with the same number of pumping hours of the year previous, 5½ tons of soft coal at an average price of \$10 in 1920 made a charge of \$55 for fuel. In 1921, 2.1 tons of soft coal at an average price of \$10, together with 5 tons of screenings at \$3.50 on the dock, made a total charge of \$38.50, or a saving of \$16.50 per day.

The pay-roll at the pumping station two years ago, when two engineers and two firemen were employed, was as follows:

Chief engineer	\$85 per month
Second engineer	70 per month
Two firemen at \$65.....	130 per month

This made a total of \$285 for the monthly pay-roll. The present pay-roll of the plant is two engineers at \$125 per month, making a total of \$250, and three firemen at \$90 per month, making a total of \$270, or a grand total of \$520 per month. The third fireman was employed before the installation of the blower system, and the increase in salary was also instituted prior to that installation. These increases were one of the reasons, together with the increase in the price of coal, that made it necessary to do something to decrease the cost of operation. A comparison of operating data in April, 1920, prior to the installation of the blower system, and in 1921 after its installation, are of interest:

1920	
Total hours pumping.....	478 hours
Total gallons pumped.....	23,067,616
Total tons of coal.....	108 tons 340 lbs.
1921	
Total hours pumping.....	350 hours 40 minutes
Total gallons pumped.....	17,385,082
Total tons of coal—	
Soft coal	48 tons
Screenings	38 tons
The 108 tons of coal in April, 1920, cost \$9.35 per ton.....	\$1,009.08
48 tons of soft coal in 1921 cost \$7.85 per ton.....	\$376.80
38 tons of screenings in 1921 cost \$3.50 per ton.....	133.00 509.80
Savings	\$ 500.00

If it had been possible to use soft coal instead of screenings, about 65 tons of soft coal would have done the work. The efficiency of the men in reducing the cost of operation is a big factor in following instructions as to maintaining the reservoir at the proper depth and not wasting water through overflow. It is felt, however, that the blower system deserves the major credit for the savings effected between April, 1920, and April, 1921.

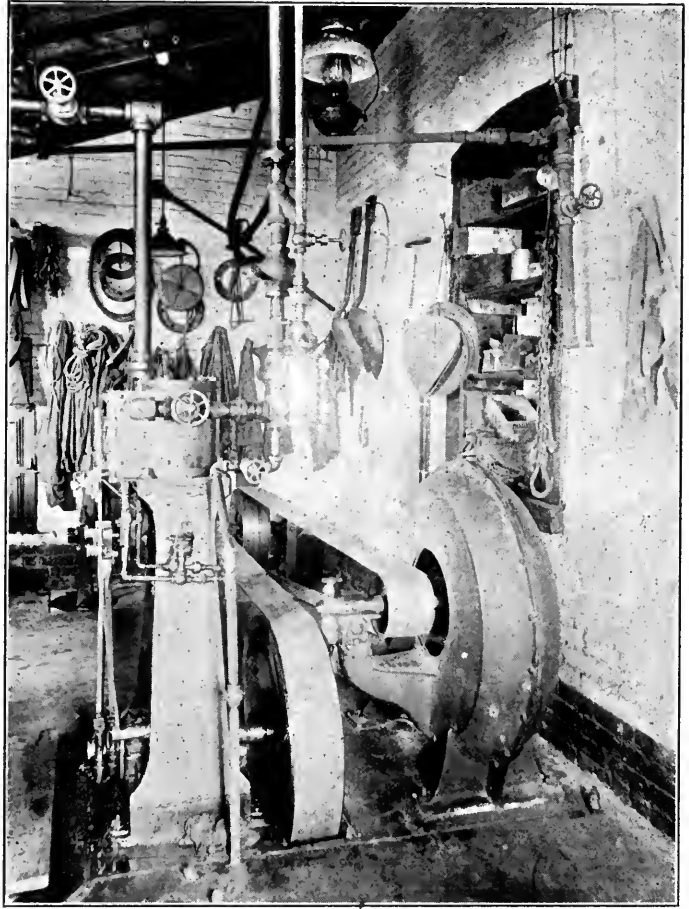
The reservoir is located about a half-mile from the pumping station, at an elevation of about 264 feet above the station. The reservoir has a capacity of very nearly 4,000,000 at a depth of 20 feet. The surrounding grounds are maintained as a park, and the main entrance is on the state highway between Albany and New York.

The distribution system is apparently in very good condition, considering the number of years the mains have been laid. Only twelve blow-outs and four breaks comprise the real maintenance costs for the year, amounting to \$1,580.37. Four new services were installed during the year, making a total of 1,142; also 13 meters were added, making a total of 195 in use.

The per capita consumption for the last year was 188 gallons, but it is felt that the taxpayers have yet to be convinced of the savings which will be effected through complete metering. It is the desire of the Board of Water Commissioners to present at a special meeting of the taxpayers this year the project of universal metering and the installation of a filtration plant, to be covered by a bond issue.

The Blower System

The blower system consists of the blower proper and a burner which is in reality a



BLOWER FOR BOILERS OF CATSKILL WATER-WORKS

system of compressed air chambers running from front to back of the fire-box with filler plates between them, all of cast iron construction and bolted together, forming a solid floor in the combustion chamber. The outer edge of the fire-box is sealed with cement so that no free air can pass. These air chambers are so arranged that draft delivered under upward pressure in them returns downward into the fire-box, striking the filler plates in a lateral flow, which distributes the oxygen so that all heat units, ordinarily passing off as gas and smoke, are entirely consumed.

Air is forced into the fire-box by a motor-driven pressure blower through a narrow slit on the under side of the air chamber cover. The little opening extends along each side and end of each air chamber and is formed by a few tiny baffles cast on the under side of the cover, which prevent the cover from fitting tightly to the top of the

box. The covers project about $1\frac{1}{4}$ inches above the filler plates. The inside of the cover flange is beveled, causing the air to strike the plates in a crosswise direction.

The pressure back of the air, usually about 4 inches at the burner, though much greater at the fan, forces a rebound from the filler plates and a thorough mixture of the air with all particles of coal and gases both in and above the fuel bed.

The blower device makes it possible to

use lower grades of hard or soft coal, thus effecting a saving in fuel cost. It produces a full flame, because sufficient oxygen is supplied and mixed with the fuel and gases to consume all of the carbon when it is in the combustion chamber. A temperature is maintained in the chamber high enough to consume all the gases. This temperature usually ranges from 2,500 to 2,800 degrees Fahrenheit and can be increased to a much higher figure if desired.

New Street Lighting Units in Rochester

A Globeless Type of Standard Developed for Residential Districts

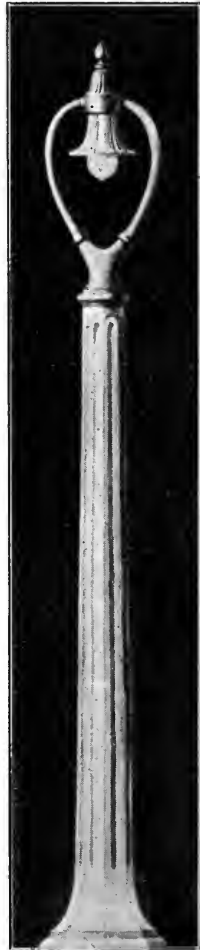
ROCHESTER, N. Y., has recently installed 200 units of a new globeless type of standard for series incandescent street lighting. These units were built to solve the problem of securing an attractive and efficient street lighting system for a residential district, with a minimum initial and up-keep expense.

In residential districts the question of proper lighting has two possible solutions: there must be either large lamps with long spacing, or small lamps with short spacing, for the proper uniformity of light intensity. The globeless unit does away with the high absorption of some types of diffusing globes. The globe may absorb from 25 to 40 per cent of the light, and since half of the light is in the upper hemisphere, it is lost, as far as lighting the street is concerned. This applies to residential streets where trees and buildings set far back from the curb line do not reflect the light onto the street. In business streets or where there are solid blocks of apartment houses built out to the sidewalks, the upward light illuminates the

façade and improves lighting.

By its construction the new globeless unit eliminates both of these features in residential streets. By extending the porcelain insulator down and flaring it at the bottom, it is made to serve three purposes: those of insulator, reflector and socket-holder. The absorption feature is thus eliminated and the design of the reflecting surface is such that all the light from the lamp is sent down, thus adding 100 per cent to the light on the street. Glare is eliminated by the use of bowl frosted lamps, so positioned that the light source can be seen only against the white background of the porcelain reflecting surface.

The initial expense of glass ball globes is high, and added to it is the breakage in handling and operating—breakage which amounts to a considerable item. The globeless unit eliminates these factors, and the utilization of one porcelain for both insulator and reflector gives an added mechanical and dielectric strength. It effectively replaces the standard type of steel reflector, the enamel of which often chips off in service.



How to Promote Fire Prevention Day and Week

A Program for Schools, Chambers of Commerce, Local Merchants and Civic Organizations

EVERY man, woman and child in the United States suffers either direct or indirect financial loss because of the seemingly unbridled advance of our national fire loss. Considerably more than \$300,000,000 goes up in smoke every year. This is but one item of the loss. There are on an average 18,000 human lives lost, while some 60,000 persons suffer bodily injury in varying degree.

For a number of years it has been the custom to observe October 9 as Fire Prevention Day in some fitting way. This date has been generally accepted for such observance throughout the country because it is the date of the memorable Chicago fire of 1871. Frequently a week's program is arranged in the larger cities and suitable exercises designated for each day of the week.

We must carry on our educational work for fire prevention every day, of every week, throughout every year, until nine-tenths of our present fire waste has been eliminated. That this is possible is proved by the fire records of Europe, where the annual per capita fire loss is only one-tenth that in this country.

As appropriate ways and means of effectively observing Fire Prevention Day and Week and of giving more widespread circulation to propaganda directed toward reducing our fire losses, local organizations can prove effective as noted below:

Chambers of Commerce.—Because chambers of commerce are representative of the foremost business interests of the community, naturally the membership is substantial and influential. These bodies should be prompted to interest themselves in developing a suitable program for the observance of Fire Prevention Day and if possible for each day following for a week.

Mayors of cities should be urged to issue proclamations calling the attention of merchants, industrial organizations and dwellers in the home to common and generally disregarded hazards.

A campaign of cleaning up rubbish and keeping it cleaned up should be promoted. Chimneys, heating flues, electric wiring and other appliances likely to be associated with fire hazard should be inspected periodically and kept in

first-class safe condition.

Boards of Education—Schools.—Through the local Board of Education, Superintendent of Schools or official committee of the educational system, school pupils should be made to take part in fire drills in order that they may be practiced in vacating a threatened school building. In this connection the local school authorities should be impressed with the importance of fire-safe school buildings. The average child is compelled to attend school in the neighborhood of 1,000 hours a year. Twenty-five million school children in the United States while benefiting from compulsory education are also compelled through the indifference of their parents and the governing authorities, whom their parents have chosen or allowed to attain office, to attend school in "fire-traps." Only 5 per cent of the schools in the United States come within the class known as "Class A" construction—thoroughly fire-safe.

The same efforts towards fire prevention should be directed among officials responsible for the construction and conduct of such public institutions as hospitals, infirmaries, theaters, hotels or other places where people assemble in large numbers and hence are exposed to varying hazards with respect to injury from fire.

Interest of school children can be stimulated in fire prevention work by encouraging them to write essays on the subject, first of course giving them necessary information as to the fact that there are a number of materials which, used singly or in combination, will produce thoroughly fire-safe structures. Among the school exercises that might be planned would be a fifteen minutes' talk by the Mayor, Chief of the local Fire Department or some local member of the National Fire Protection Association, this organization having members in practically every city in the United States.

Rotary Clubs and Civic Organizations.—Rotary clubs and civic organizations are in a position through the nature of their membership to exert the same kind of influence as may be directed by chambers of commerce. In fact, the work of all three such bodies could well be coördinated and carried through on a definite single program.

Advertising.—Local merchants, particularly those patronizing the community newspapers, should be urged to carry some slogan line in their copy during Fire Prevention Week (October 9 to 15 inclusive). The greatest medium for creating public sentiment is the newspaper; and in spite of opinion to the contrary, it has a human side and its first and last interest is its home town.

Street Trees Killed by Ice Cream Salt

City Trees Menaced by a Thoughtless Practice Which Must Be Stopped

By Samuel N. Baxter

Arboriculturist, Street Tree Department, Fairmount Park, Philadelphia

THE increasing popularity of ice cream has caused many new companies to enter the field to satisfy the demand. With new "service stations" springing up on all corners, another agent in the destruction of the shade trees of our city streets has become more pronounced. Unfortunately, the effect is seldom realized by the average person until the salt water from the delivery wagon has penetrated the gutter to the roots of the tree, which it slowly but surely kills. Nor does this brine have to be deposited directly under the tree to kill it. Where the grade of gutter falls toward the tree from the point where the wagon stops to unload ice cream, the con-

tinual drippings of salt water find their way along the gutter to a considerable distance. I have seen large sugar and silver maples near the sidewalk, whose roots extended out under the walk to the gutter, become sickly and finally die from the effect of ice cream salt deposited in the gutter 100 feet away from the trees, but draining in their direction.

City foresters will do well to protect shade trees from this practice by having the vehicles stop where the drippings may enter a culvert or inlet, or insist on watertight receptacles which may be drained at intervals where the solution can do no harm.

Tractor and Trailer in All-Year Municipal Service

THE Superintendent of Public Service of Highland Park, Mich., is a thorough believer in the mechanical handling of municipal problems, where possible. In addition, it has been the aim of the department to reduce the capital investment necessary for apparatus and equipment, thus giving the city more serviceable machinery for its money.

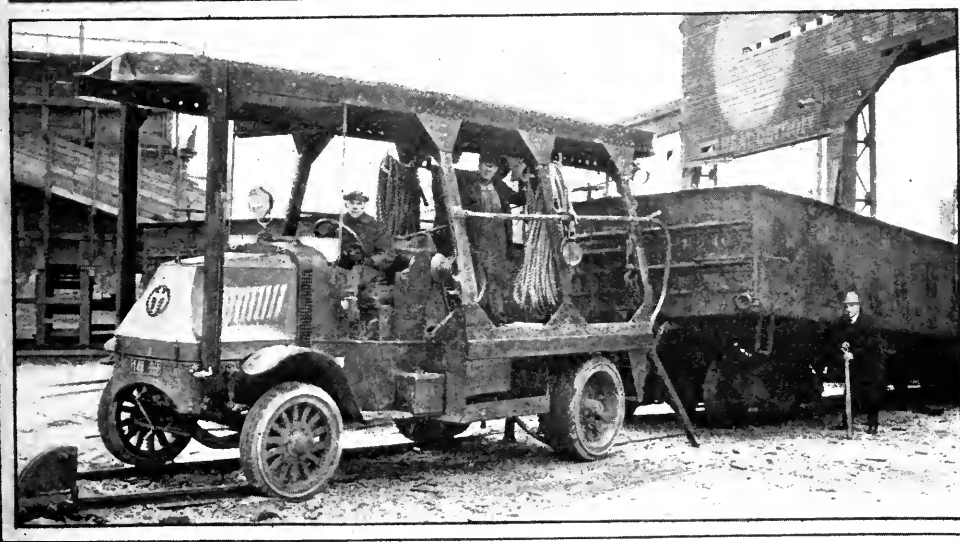
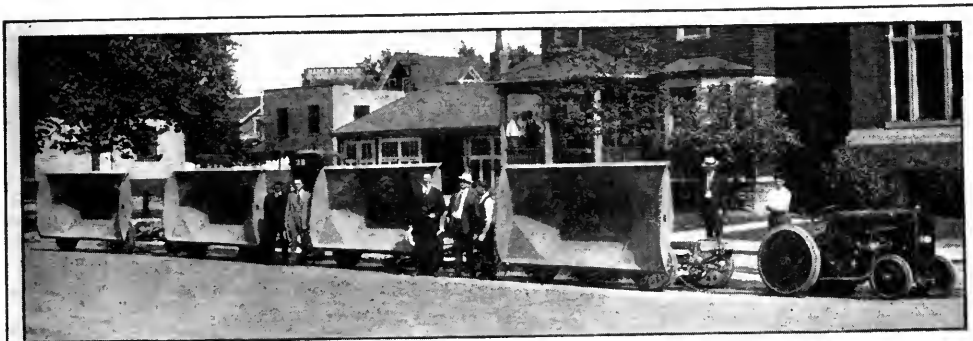
In Highland Park, they use Fordson tractors with Detroit trailers for the transportation of garbage, ashes and refuse, the tractors costing \$657 with \$200 to \$300 additional for the rubber-tired wheels and other equipment and the trailers with dual wheels costing \$1,500 each.

In winter time the tractors are equipped with Mansfield snow-plows and last winter showed that the snow was removed at a cost of from 6 to 8 cents per cubic yard as against 50 to 75 cents per cubic yard by hand shoveling or other means. The outfit was able to handle 18 inches of snow at 6 miles per hour and light snow was cleaned off the sidewalks with a double plow at the rate of 18 miles per hour, so that the Highland Park business man stepped out onto a clean sidewalk when he started to work

the morning after a heavy snowfall.

In the course of their work it became necessary for the Recreation Committee of Highland Park to excavate for a $\frac{3}{8}$ -mile running track 20 feet wide, where there was on an average of 2 feet of clay. This was handled in a most expeditious manner by a steam shovel, a tractor and a train of trailers. In all it was only necessary to have 4 men for the entire job. The same trailers and tractor were used to fill the excavation for the track with cinders and stone, of course using a steam roller afterwards. The cost of the entire operation was on an average of 6 cents per cubic yard.

In Detroit, Mich., the municipal street railway has a Mack tractor, costing with its full equipment, including the overhead rail for the Mead-Morrison winch, tool boxes and two 15-ton jacks, about \$12,000. This truck was used to lay 400 street railway track frogs, weighing 5 to 6 tons each. It set them in position in an average of $2\frac{1}{2}$ minutes each. This same work required 4 or 5 hours of steady work by a large group of men when done by hand. The tractor, which is shown in the accompanying illustration, is also used for other work.



HOW TWO MICHIGAN CITIES OVERCOME MUNICIPAL HAULAGE PROBLEMS

Top—Highland Park hauls its Detroit trailers with tractors for garbage and ash collection. Middle—Type of snow-removal apparatus used in Highland Park, light-weight tractors and Mansfield snow-plows. Bottom—Detroit's emergency truck lifting a loaded gondola car

In one photograph, it is shown lifting one end of a loaded coal car which had run off the track. Underneath the tractor is seen one of the two 15-ton jacks used to brace the rear axle and, above, the rail on which

the winch runs. This rail extends 4 feet in front of the car and 6 feet behind. The winch and tractor are used for all kinds of wrecking jobs throughout the city and have proved a very good investment.



HORSE-DRAWN SQUEEGEES AND HAND-BROOMS WITH FLUSHERS ARE USED TO SOME EXTENT IN MINNEAPOLIS

Street Cleaning Problems in Minneapolis Part I

Abstract of Important Report Prepared by Minneapolis Civic and Commerce Association

DURING 1920 the Bureau of Municipal Research of the Minneapolis Civic and Commerce Association, at the request of several aldermen of that city, undertook to make a study of street cleaning and the snow removal problem throughout the city. The snow removal problem was studied particularly during the winter of 1919-20, and the street cleaning studies extended throughout the summer of 1920. The facts which are tabulated below are the result of field observations and of comparisons of work done and cost of street cleaning for several years previous, both in Minneapolis and in other cities. This material is reprinted in two installments for the benefit of readers of *THE AMERICAN CITY*, who will find much of interest and value for study and for comparison with results obtained in their own cities.

Nature and Sources of Street Dirt

Refuse appears on the streets in two forms, namely, fragments of various sizes, and fine dust. By giving the streets proper daily attention, the larger deposits of street dirt can be taken care of by patrolmen, and the fine dust disposed of by flushing or other machine cleaning. There are two main principles which should be followed out in street cleaning work:

1. The dirt should be collected as near as possible to its origin upon the street.
2. The refuse should be collected and disposed of as near as possible to the time of its origin.

If these principles are not adhered to, heavy traffic soon grinds the dirt into fine dust and it is spread over the entire street, causing general annoyance and discomfort.

The sources of street dirt are many in number. These may be divided into two distinct classes—the avoidable, and the unavoidable.

The avoidable class includes:

1. Building materials from new construction
2. Building roofs and windows (alterations)
3. Street repairs and excavations
4. Sidewalk sweepings
5. Refuse barrels set out for collection purposes
6. Smoke
7. Refuse thrown into streets by pedestrians

It is not possible to eliminate wholly all the above sources of street dirt from city streets, but these, along with others, may be greatly lessened by the proper coöperation of the police department and the citizens at large.

The second, or unavoidable, class of dirt on paved streets includes:

1. Mud and dirt from adjoining unpaved streets and alleys
2. Leaves
3. Blown dust
4. Horse droppings
5. Dirt deposited by vehicles

The street cars are a source of considerable dirt, and the tracks make it difficult to thoroughly clean the streets. With proper paving between the tracks and good drainage provided, this difficulty of cleaning may be minimized.

Present Methods and Equipment

Hand Methods.—The first and most simple method of street cleaning in Minneapolis is by the hand patrols. The city cleans no streets by direct sweeping alone, but employs men to do patrol or pick-up work on the paved streets. These "white wings" are assigned certain areas, varying from three to four blocks in the down-town district to eight to ten in the outlying districts, to do pick-up work. Their equipment usually consists of an 18-inch broom and a 24-inch pan. They patrol their areas, picking up deposits of street refuse and disposing of it in street receptacles provided for that purpose. These receptacles are emptied as needed, by pick-up men and teams and dump-wagons. No record has been kept of the amount of street dirt collected by these hand patrols, but general observation has shown that the cost of their work is quite justifiable. The average area assigned to each white wing in the down-town district amounts to between 9,000 and 10,000 square yards. The cost of cleaning 1,000 square yards once amounts approximately to 55 cents.

There are many factors which determine the extent of patrol areas, including condition and density of traffic, condition of pavement, and quantity of dirt deposited. A study of this work showed that in many cases sweepers were assigned too small areas; that they could cover their routes in from 30 to 40 minutes. In all cases observed, it was entirely unnecessary to cover the routes so often, and the sweepers had too much time to rest. There was also a noticeable shortage of receptacles for disposing of street refuse after collection, and in several localities this refuse was left in piles in the gutters to be collected later by pick-up teams. By leaving these piles all day the dirt became dried out, and if there was any wind, it was again blown over the street. In some cases the night flushing crews cleaned the streets before these piles were removed from the gutters, and washed them away into the gutters.

With better organization and supervision and better planning of patrol routes and areas for the street sweepers, and with better provision for the disposal of refuse after collecting, great improvements can be made in the white wings' service.

Gravity or Pressure Tank Flushing.—The

method of street cleaning most generally used in Minneapolis at the present time is gravity machine-flushing. The machines used are the Studebaker type* with Studebaker patent nozzle, each machine being equipped with two nozzles. The tanks are filled under hydrant pressure, which at night runs as high as 70 to 80 pounds. Each crew consists of two machines, one hydrant man for filling the tanks, and two gutter men for sweeping the gutters. The machines are horse-drawn by privately-owned teams hired by the city. The flushing swath of these machines, with nozzles completely opened, varies from 12 to 14 feet under high pressure to practically nothing, so that the effective average swath is approximately 6 feet.

Each crew is assigned a definite area to clean in 8 hours each day. In most cases they do good work and utilize the full 8-hour period, but there are exceptions. Most of the streets in the city, and particularly in the down-town district, are cleaned three times a week, so that the crews go over each route every other night except Sundays.

The study disclosed several things lacking in the present system and under the present organization of the street cleaning forces. With the exception of one or two cases, there were no foremen to take charge of the work and nothing to promote increased economy and efficiency in the flushing work. The gravity flushers cleaned approximately 4,000 square yards per hour per machine, using approximately 1,700 gallons of water per 1,000 square yards.

In most cases the streets are gone over many more times than is necessary. With proper supervision and a foreman on the job working toward just as effective cleaning in less time, much better results could be obtained.

Power Flushing.—Another form of flushing used by the city is the so-called "power flushing." The machines for this work are somewhat similar to the gravity flushers, with the exception that each machine is equipped with a gasoline engine to furnish the flushing pressure. The Studebaker machines are also used for this purpose. By varying the speed of the engine, different pressures can be produced and the cleaning

*The trade name has recently been changed to "South Bend" type.

swath varied. These flushers have proved a great deal more effective than any of the other machines used by the city.* The effective cleaning swath runs as high as 12 feet, and a greater yardage can be covered in a night at much less cost. Each crew consists of two machines and one hydrant man, without gutter men. The gutter cleaning is carried on in the daytime by the white-wing patrol. The power flushers are used in only two wards in the city, the other wards using gravity flushers and squeegee machines.

An intensive study was made of the power flushing practised in the Fifth Ward. The different crews were timed during the summer to obtain accurate data as to time of cleaning, for computing unit costs of cleaning per 1,000 square yards. The area cleaned ran very high for the power flushers, amounting to approximately 10,000 square yards per hour per machine, and using a little over 500 gallons of water per 1,000 square yards. There were no foremen to take charge of the flushing crews and they were merely assigned certain areas to clean each night.

In the Fifth Ward the streets are flushed every other night, each crew having a definite area to cover each night. These crews started at 5 o'clock in the afternoon and worked until their area was flushed. It was found that at no time did it take more than

4 hours and 45 minutes actual working time to cover the entire route, and on several occasions the complete route was covered in 3 hours and 45 minutes. The men are being paid on the basis of an 8-hour day, and yet in some cases are working less than half that time. Such practice can only be laid to the lack of proper supervision. It may be argued that if a larger route was assigned, the crews would slow down their work in order to make it appear that they were assigned too much area. The crews did not hurry at all and could clean nearly twice the area in the time required of them. However, with no foreman on the job, no time is kept of their flushing, and when their routes are covered the men are through for the night. Such practice is of course wrong, and with centralized control and proper supervision this sort of thing can be eliminated.

Squeegee Cleaning.—Squeegee cleaning is also used to a large extent in this city. The type of machine used is the "Kindling" of Milwaukee. This machine is equipped with a 500-gallon tank with a sprinkling device in advance of a rotary squeegee. The effective swath of these machines is approximately 6 feet and they can clean an average of 4,000 square yards per hour per machine. They use about 750 gallons of water per 1,000 square yards. The machines generally work in crews of two or three machines with one hydrant man and two gutter men. The work is effective only on the smooth asphalt and wood block pavement.

* See discussion of motor flushers in the next issue of THE AMERICAN CITY.

Governor Cox of Massachusetts Urges Public Works

THE following is an extract from a recent letter of Governor Channing H. Cox of Massachusetts to county, city and town officials, urging the immediate prosecution of public work as a practical measure of relieving unemployment and stimulating a general increase in business activity:

"The unemployment situation may be helped if the appropriate authorities will now start at once upon state, county, city and town work wherever possible, rather than to wait until spring. I do not urge that useless undertakings be invented or that extravagance be encouraged, but I do

urge that necessary improvements and repairs be made now, needed buildings be erected, and that all public work possible may be started. If plans are now made, the weather may permit street and highway work to be continued later than usual, and at any rate work may be resumed earlier next spring.

"If each city and town will engage in useful work now and give employment to those residents most needy, it will go far to relieve the possibility of distress this winter. It is not necessary to point out that if unemployment in any line is increased, it helps business in other directions."

Fighting the Gipsy-Moth in New Jersey

By Harry W. Weiss

Chief, Bureau of Statistics and Inspection, Trenton, N. J.

THE presence of the gipsy-moth on the Duke Estate, Somerville, N. J., was brought to the attention of the State Department of Agriculture about the last of June, 1920. At that time the insect was found to be present in a large block of blue spruces, on about four acres of which the trees were completely defoliated. Thousands of old egg masses and caterpillars were present, and these, together with the

immediate use, and this money, together with funds appropriated later by Congress and by J. B. Duke, made it possible to prosecute the work rapidly and effectively. Up to the present time \$254,784 has been expended, of which amount the state of New Jersey contributed \$112,000, the Federal Government \$117,784, and Mr. Duke \$25,000. This money made it possible to put a force of 100 men in the field to determine



FOR SMALL TREES AND UNDERGROWTH A SPREADER IS ATTACHED TO THE NOZZLE, CAUSING A FAN-SHAPED SPRAY TO BE DELIVERED

dead trees, presented an alarming spectacle, indicative of what would occur over the entire state were the insects allowed to spread unrestricted.

As soon as the infestation was noted, word was sent to the U. S. Bureau of Entomology, and this bureau, in spite of the limited funds at its disposal, immediately placed a small force of scouts in the field. These men determined the general limits of the infestation and traced the trees shipped by the Duke Estate since 1911. Early in November, 1920, the New Jersey Legislature, realizing the seriousness of the invasion, appropriated \$112,000 for

the extent of the infestation and to purchase spraying machinery and supplies for the fight. The following statements outline briefly the findings and work accomplished during the first year.

After funds were available, an intensive scouting of the region around Somerville was started. The entire territory known to be infested was examined and all egg clusters of the insect killed. Afterwards, this work was extended outward into surrounding townships. At present 410 square miles is known to be infested, of which amount 175 is generally infested, the remainder lightly. About most of this territory a wide

border area has been examined and free traces of the gipsy-moth have been found. All egg masses found were killed by painting them with creosote. More than 3,000,000 clusters were so treated in the township in which Somerville is located, fewer in the others. After determining the extent of the infested area and killing the eggs, the next important operation consisted in spraying all of the foliage where eggs were found. This necessitated the purchase of eleven Ward-LaFrance trucks, each equipped with a Fitzhenry-Guptill spraying outfit, consisting of pump and tank. These trucks have a carrying capacity of $3\frac{1}{2}$ tons, exclusive of the weight of the sprayer body, and have such oversize parts as are necessary to stand the double strain of propelling themselves while loaded to their full capacity and spraying at full pressure. The sprayer pumps are driven from the main line shaft, the drive being capable of transmitting the full engine power. Each pump is a single-acting, triplex-plunger type, having cylinders with $3\frac{1}{2}$ -inch bore and 4-inch stroke, and the speed is regulated so as to give a delivery of 50 gallons per minute at a pressure of not less than 600 pounds. The solution tank, which is made of clear white pine, has a capacity of 400 gallons.

Each machine is furnished with 2,000 feet of 1-inch, 8-ply, rubber-lined, smooth-waterway, rubber-covered spray hose, and the hose and couplings are guaranteed to stand a test pressure of 1,000 pounds. These high-pressure spraying machines were necessary in order to apply the poison mixture in a

finely divided mist to the tops of the tallest trees—even when several thousand feet of hose were used.

All foliage along roadsides, wooded areas and private plantings where eggs were likely to hatch were kept covered with arsenate of lead, during the feeding season of caterpillars. This meant that an immense amount of work was required of each machine, as all of the spraying had to be done within a comparatively short time.

Over 2,400 acres was sprayed, not including ridges of miscellaneous growth, along fences, river banks, etc. Seventy-five tons of arsenate of lead was used and approximately 3,000,000 gallons of spray delivered. In order to know definitely where it was necessary to spray, 894 square miles had to be scouted, and 1,900 miles of roadsides examined. In addition to the large-scale spraying operations, 20,000 trees were banded with tree-banding material in order to prevent caterpillars from ascending, and 15,000 trees were banded with burlap in order to trap the caterpillars.

The effectiveness of the work done is apparent from the fact that it was difficult to find gipsy-moth caterpillars even in the most heavily infested localities. All of the control work is being conducted jointly by the New Jersey Department of Agriculture and the Bureau of Entomology, U. S. Department of Agriculture. During the fall of 1921 the entire territory is being combed as thoroughly as possible in order to discover egg masses, and in the spring of 1922 the area will be sprayed again.

On the Calendar of Conventions

OCTOBER 11-14.—ATLANTA, GA.

International Association of Fire Engineers. Annual convention. Secretary, James J. Mulcahey, City Hall, Yonkers, N. Y.

OCTOBER 12-14.—LAWRENCE, KANS.

League of Kansas Municipalities. Annual convention. Secretary, John G. Stutz, University of Kansas, Lawrence, Kans.

OCTOBER 13-16.—URBANA, ILL.

Better Community Conference. Annual conference. R. E. Hieronymus, University of Illinois, Urbana, Ill.

OCTOBER 20-21.—COLUMBUS, OHIO.

Ohio State Conference on City Planning. Annual conference. Secretary-Treasurer, Charlotte Rumbold, 201 Chamber of Commerce Building, Cleveland, Ohio.

OCTOBER 24-26.—NEW ORLEANS, LA.

National Association of Commercial Organization Secretaries. Annual meeting. Secretary-Treasurer, Ralph H. Faxon, Mississippi Valley Association, New Orleans, La.

OCTOBER 24-28.—BALTIMORE, MD.

American Society for Municipal Improvements. Annual convention. Secretary, Charles Carroll Brown, P. O. Box 234, St. Petersburg, Fla.

NOVEMBER 14-16.—CHICAGO, ILL.

City Managers' Association. Annual convention. Secretary, Harrison G. Otis, City Manager, Clarksburg, W. Va.

NOVEMBER 14-18.—CHICAGO, ILL.

National Association of Civic Secretaries. Annual convention. Secretary, Francis T. Hayes, City Club, Hollenden Hotel, Cleveland, Ohio.

NOVEMBER 14-18.—NEW YORK, N. Y.

American Public Health Association. Annual meeting. Secretary, A. W. Hedrich, 370 Seventh Avenue, New York, N. Y.

NOVEMBER 16-18.—NEW YORK, N. Y.

American School Hygiene Association. Annual meeting. Secretary, Harry B. Burns, M.D., Board of Public Education, Pittsburgh, Pa.

NOVEMBER 16-18.—CHICAGO, ILL.

National Municipal League. Annual convention. Secretary, Harold W. Dodds, National Municipal League, 261 Broadway, New York, N. Y.

JANUARY 17-20, 1922.—CHICAGO, ILL.

American Road Builders' Association. Annual convention. Secretary, E. L. Powers, Editor *Good Roads*, Waverly Place, New York, N. Y.

The Propulsion of Municipally-Owned Harbor Craft

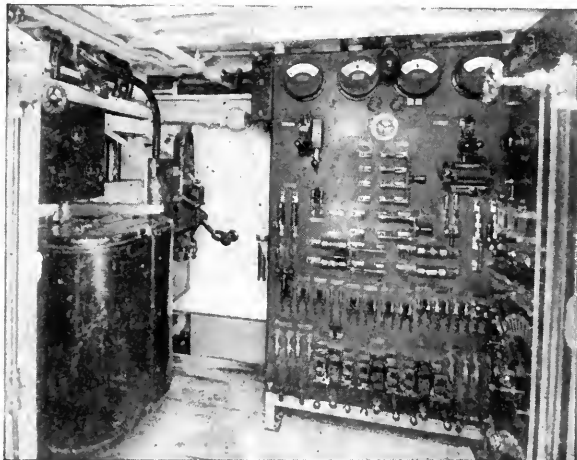
By W. E. Martin
Marine Engineer

EVERY city is interested in knowing that its municipally-owned vessels, such as ferry-boats and fire-boats, are built in accordance with the latest and best engineering practice. The object of this article is to call attention to a new system of propulsion which is particularly adaptable to harbor craft, and more especially to fire-boats and ferry-boats.

In laying out a new boat, one of the most important questions to be decided is that of how it will be propelled. There are four systems available besides the reciprocating engine, which is more commonly known, but which, from an economy standpoint, falls far below any of those described below.

The geared turbine drive consists of a high-speed steam turbine with a gear which reduces the turbine speed of about 3,000 r.p.m. to the propeller speed of about 100 r.p.m. It is especially applicable to merchant ships and is in use on several hundred to-day.

In the steam-electric drive, one or more

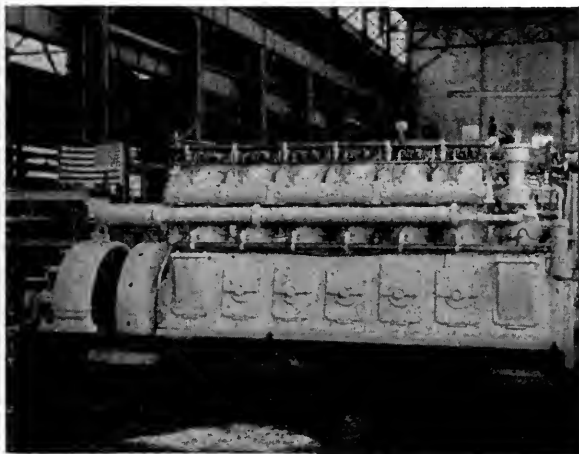


CENTRAL CONTROL STATION ON ELECTRICALLY DRIVEN BOAT

steam-turbine-driven generators furnish electric power to drive motors directly connected to the propeller-shafts. This system is used on all the latest U. S. battleships and is also considered ideal for very large express steamers.

The Diesel engine, which is an internal combustion engine using heavy oil as a fuel, is becoming increasingly popular, because of its high fuel economy. In the "direct" Diesel drive, the engine is direct-connected to the propeller shaft.

The Diesel-electric drive is similar to the steam-electric, except that the electric generators are driven by Diesel engines instead of by steam turbines, and of course no boilers are required. This is the scheme which, considered from all angles, should prove best for harbor boats, but before we decide that no other form of drive will do as well, let us discuss this system. Westinghouse engineers have made a study of Diesel-electric propulsion for the past three years, and their findings indicate the sys-



WINTON-DIESEL ENGINE AND WESTINGHOUSE GENERATOR FOR MARINE SERVICE

tem herein described to be entirely sound and practical engineering. This has been borne out by subsequent successful operation of this equipment in service.

In this type of propulsion Diesel engines are used as the prime movers furnishing power to the propeller through generators, direct-connected to engines which in turn supply power to the driving motor. The Diesel engine generator sets can be arranged in convenient sizes to give the total power required, these small comparatively high-speed sets weighing much less than would single low-speed engines connected directly to the propeller. Direct current is advocated rather than alternating current, on account of simplicity of operation. Using direct-current generators makes it possible to run the engines at constant speed, and connecting the generators in series eliminates the necessity of close governing, which would be necessary with machines in parallel. If alternating current were used, it would probably be necessary to vary the speed of the engines in order to vary the propeller speed, while with the direct-current series operation the speed of the propelling motor is varied by simply regulating the excitation of the generators. Motor speed variation may be obtained from zero to the maximum in either direction by means of a reversing rheostat, which controls the excitation of the generators supplying power to the motor. The motor is separately excited at a constant value, and consequently the speed varies directly with the generator voltage, which is regulated by the reversing rheostat. This arrangement makes it possible to operate the ship at almost any speed desired, either ahead or astern. The scheme of operation permits reversing of motor without interrupting the main circuits, since only a relatively small generator field current is handled in the control.

Diesel-Electric Drive for Ferry-Boats

The ordinary double-ended ferry, if both screws are operated by one engine, is not nearly so efficient as if a separate motor was connected to each screw, the after-screw delivering all the power needed to propel the ship, and the forward motor turning fast enough to prevent the screw from acting as a drag.

Considerably more space is available for

passenger cabins and vehicles, as the Diesel-electric equipment takes less space because of elimination of boilers, stacks, and long propeller shafting. Also, the engine sets can be located where most convenient.

A ferry-boat is required to go across a crowded harbor, sometimes in a fog. Operation from the pilot-house giving the pilot direct control of the ship and instantaneous response from the motors, is highly desirable.

The machinery on a ferry-boat should be reliable, as a regular schedule must be maintained throughout the year. With the system described above, "all the eggs are not in one basket," so that if one engine should have trouble it may easily be cut out of the system without crippling the ship.

Advantages in Fire-Boat Operation

Reliability is paramount. Next, maneuvering ability is of great importance. When called to action, the fire-boat must be able to dart across a crowded harbor, thread its way among ships and boats of every size and in every state of confusion, place itself in the best position to reach the seat of trouble, and then adjust itself instantly to rapidly changing conditions. It may frequently happen that millions of dollars' worth of property, scores of human lives, and its own safety will depend upon its ability to move and turn in terms of seconds.

When it comes to agility, an electrically-propelled vessel can far surpass any other type. Consider the possibilities of a boat with twin propellers, each propeller driven by a separate motor. It is entirely practical to place, either in the pilot-house or on the bridge, two controllers (one for the star-board propeller and the other for the port), which control directly the operation of the motors. When the handle of one controller is moved in the "ahead" direction, the corresponding motor starts up, at first slowly and then with constantly increasing speed as the movement of the handle continues, until full speed is reached. Bringing the handle back to "stop," stops the motor, and moving the handle in the "astern" direction reverses the motor in a similar manner. In the extreme "astern" position of the handle, full speed and full power astern is obtained. Any number of speed steps can be provided in each direction; the propeller speed will

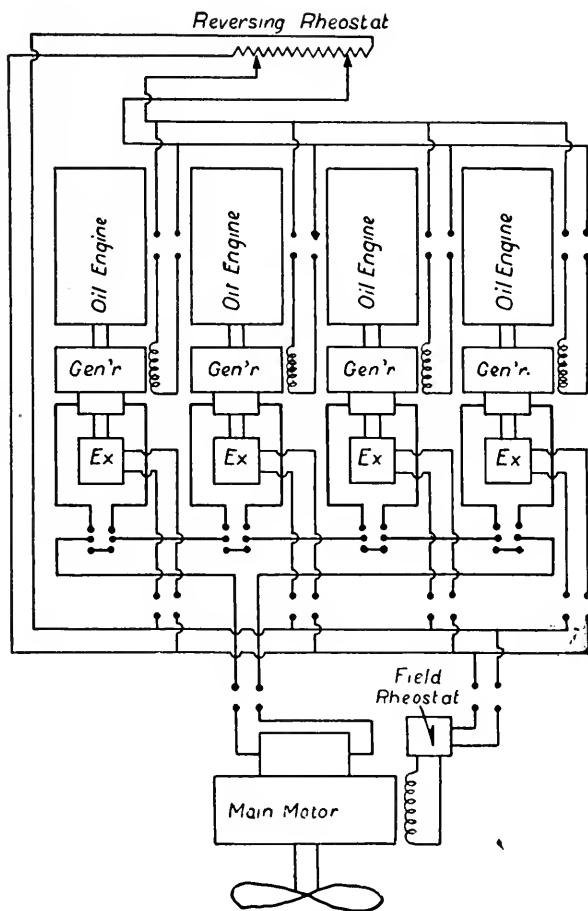
remain constant on any step until the handle is again moved; and the change from full speed ahead to full speed astern can be made in 5 seconds or less.

Since, by operating the propeller, the boat can be handled much more rapidly and delicately than by using the rudder in the usual manner, it is evident that the control of the boat can be placed literally at the finger-tips of a man on the deck, who, without the loss of a second, can maneuver in any desired manner and whirl the boat around as if on a pivot by merely moving the controller handles.

In the meantime, the main engine driving the generators runs continuously at full speed in one direction only (which is the best condition for the Diesel engine). The engineer has nothing to do with the operation of the boat, except to keep the engine running properly; though a set of signals informs him of what is going on, and he has a duplicate set of controls to use in case the deck controls are put out of commission.

No boats have as yet been equipped in the manner described, but the practicability of the principle is demonstrated by the yacht *Elfay*, which has a Diesel-electric auxiliary engine. This yacht, which has a single propeller, is controlled from the deck by a controller resembling the familiar trolley-car type. Moving the handle of this controller around to the left, starts the propelling motor in the ahead direction and gradually brings it up to full speed. Turning the handle to the right reverses the motor in a similar manner.

The *Elfay* has been in active service about a year and has proved thoroughly successful. She is equipped with a 115-h.p. Winton full-Diesel engine of 425 r.p.m. which is directly connected to the 75-kw. Westinghouse direct-current generator of 125 volts. The propelling motor is a 90-h.p. Westinghouse machine with a speed range of from 0 to 350 r.p.m. A 9-kw. generator is also driven from the main engine to sup-



WIRING DIAGRAM FOR DIESEL-ELECTRIC PROPULSION OF BOATS

ply electric power for energizing the fields of the main generator and motor and also for lighting and power purposes. An auxiliary 15-kw. oil-engine-driven generator charges a storage battery which supplies power for all purposes except propulsion when the main engine is not in use.

The exact details of a Diesel-electric equipment to be used on a given fire-boat will, of course, depend entirely upon circumstances, but it seems probable that the following arrangement will be more or less closely followed.

The boat will have two propellers, each to be driven by a direct-current motor. There will be two main propelling units, which are duplicates, and each will consist of a Diesel engine direct-connected to a direct-current generator. Either unit will

provide sufficient power to operate the boat at about 75 per cent full speed, and both will be used for full speed. The motors will be controlled from two stations, one in the engine room and the other on the pilot-house or on the bridge.

The fire-pumps will be operated by electric motors, supplied with power from one or more Diesel-engine-generator sets, which are to have the same characteristics as the propelling units; and connections are to be so arranged that power from any generator can be used, when desired, for either the

pump-motors or the propelling-motors. This provides complete flexibility and insures that the boat will function unless very seriously damaged.

The principal requirements of both fire-boats and ferry-boats, the advantages peculiar to Diesel-electric drive, prominent among which are reliability, maneuvering ability, compactness, and economy, indicate it to be the proper means of propelling vessels of this type.

ACKNOWLEDGMENT:—Illustrations by courtesy of Westinghouse Electric & Manufacturing Company.

Our Earth Roads: What Shall We Do With Them?

By Harlan H. Edwards

EARTH streets are usually the most neglected of city highways. Although there are often more miles of dirt streets in small cities and towns than there are pavements, it is often found that very little attention is given to keeping them in passable shape. The cause of this neglect is usually not an unwillingness on the part of the public officials to do the work, but rather an ignorance of how best to do it in order to make the available money secure the most permanent results.

We cannot pave all our streets, so we must find some other way to take care of them. There are a number of means of converting earth streets into hard-surfaced highways at a nominal expense, two of which are typical. One of these, a mixture of asphalt and earth, has been in use for several years in certain sections of the United States, while the other, a mixture of earth and a white cementing powder, is practically in its infancy, having been evolved and used chiefly around Grand Rapids, Mich.

Special Mixtures

The former method produces a surface not greatly different in appearance from the common sheet asphalt pavement. It is obtained by mixing dried and pulverized earth or sand with hot asphalt of a certain character, spreading this product on the road in the rear of the mixer and rolling it thoroughly to a smooth, even surface with steam rollers. In California this type of road has proved very satisfactory along certain boulevards or highways, and a similar type flourished for a time in the region of Kansas and Nebraska.

The other type of mixture makes virtually an earth-concrete slab, in which earth is mixed with a white powder in a concrete mixer. This is laid, smoothed, and allowed to "set up" like a cement concrete road. The finished

product has a hard, white surface and resembles in many other respects cement concrete except for the character of the material mixed with the cement.

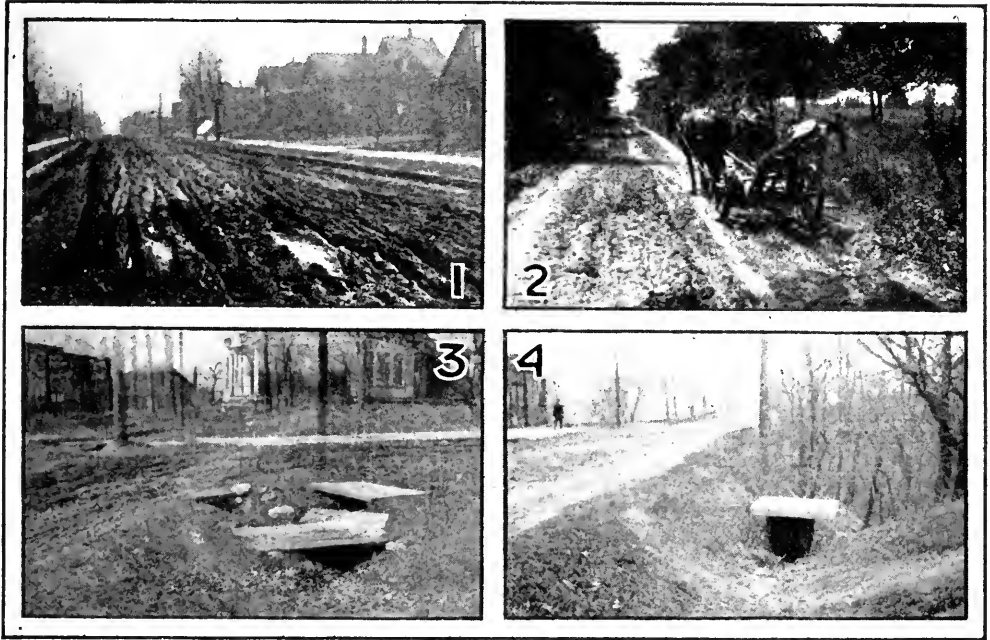
Of course such road surfaces as these cannot be expected to have the long life that cement concrete, brick and sheet asphalt or asphaltic concrete roads possess, nor can they be expected to be able to carry as heavy loads as these more permanent pavements unless they have well-drained, solid, natural foundations.

Surfaces such as these, however, obviously in the experimental stage, cannot be adopted generally until they prove their worth, and even then but a small per cent of our dirt streets will be thus improved. We must, therefore, fall back upon the good old natural earth roads, and since they are to be with us a long time, it behooves us to learn how to manage them. To properly care for an earth road does not require great skill, but rather calls for the exercising of common sense in the use of the proper tools. Earth road maintenance does not require a large force of laborers at stated intervals, but instead takes the services of a few men continuously whose business it is to work constantly to keep their roads perfect.

Drainage

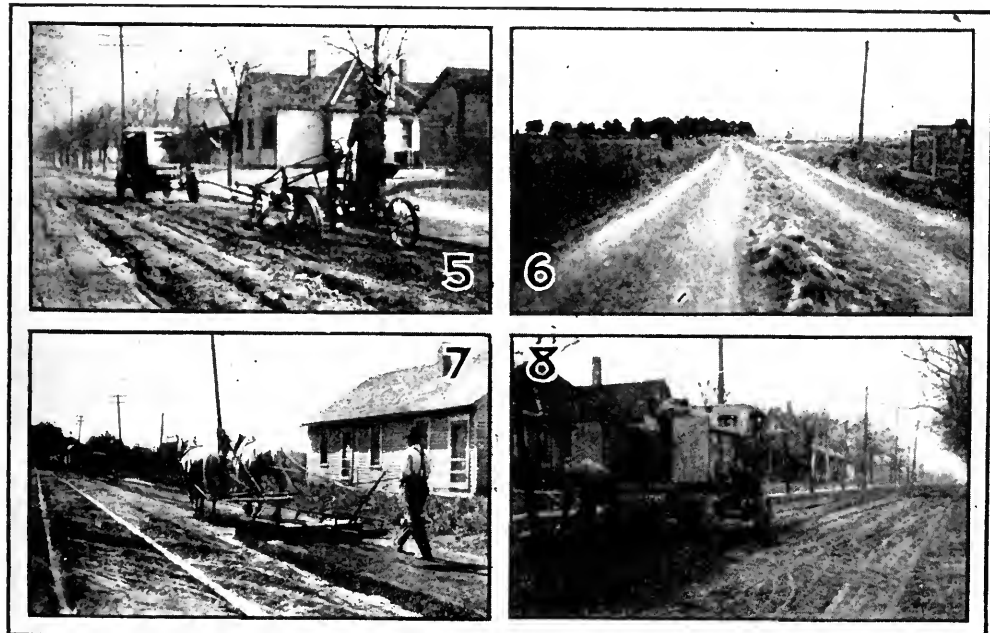
Adequate, rapid and thorough drainage is the prime requisite for good roads. It is doubly important for earth roads, because they have no rigid or load-distributing surface, and depend for their condition upon the absence of excess water from the soil. City streets are often of a level character, so that storm-water sewers with frequent inlets are necessary in order that the water may be gotten quickly away.

Where the streets slope sufficiently to cause storm waters to drain to their watercourses, and are not steep, wooden, metal, or tile



THE STORY OF EARTH-ROAD CONSTRUCTION AND MAINTENANCE IN PICTURES, PART I

1. Careful grading will eliminate this hole. 2. Keeping the weeds down is a necessary item of street maintenance. 3. Culverts and sidewalk crossings are necessary. 4. Substantial inlets on steep hills prevent wash and erosion of ditches



THE STORY OF EARTH-ROAD CONSTRUCTION AND MAINTENANCE IN PICTURES, PART II

5. A road well graded is the start of a maintenance system. Trucks or tractors, if available, are preferable for this work. 6. Grass or sod pulled to the center of the road is dangerous, as well as detrimental to the road. 7. The road drag is the patrolman's best tool. 8. Cinders, when properly applied, make a good temporary road surface

culverts are necessary at street intersections in order that the street surface be not obstructed by open ditches. Likewise, at sidewalk crossings short sections of wooden walk may bridge over the muddy gutter to permit the unobstructed passage of pedestrians. Streets lying on a steep hill, however, wash or erode quickly with the formation of deep gullies or ditches after a few storms have passed. Drainage here is not incidental, but is of greatest importance if the street surface is retained. Drain tile of ample capacity, laid under each gutter, having inlets for the storm water placed at frequent intervals on the hill, are a necessity. It is here also that smoothness of surface is needed, for if ruts are allowed to form, water will run down them, forming small ditches in the roadway.

In order that water may drain quickly from the street to the gutters, the street surface must be kept reasonably free from ruts, holes, sags, etc., by the proper use of road-maintaining tools. The grader, drag, road maintainer, etc., all have their particular uses on the road.

Grading and Dragging

The road grader is used to shape up the roadway to an even, slightly crowned surface—not to the steep-sided "hogs' backs" which are found so often. A slope of $\frac{1}{2}$ -inch to the foot is plenty, and it should never exceed 1 inch. A good grader can also be used to cut and clean the side ditches so that the rapid removal of surface water is facilitated. Much can be accomplished with this tool in experienced hands, and, on the other hand, more damage can be done by a novice in an hour than can be repaired in a week.

The road drag is the companion tool to the grader, and is the means of keeping many of our dirt roads in excellent condition at little expense. Wet weather softens the earth surface, and allows vehicles to cut deep ruts in the road. It is these ruts that the drag eliminates, producing a smooth, compacted surface for travel. The best time to use the drag is when the earth is damp, yet not muddy, so that traffic will tend to further consolidate the road.

The combination of these two tools is found in the road maintainer, which at once shapes up the road a little and drags the surface well. These machines are becoming very popular and will soon be found in every up-to-date community.

The continual use of these various road tools by experienced men in patrol maintenance is the greatest advance made by road men in the past few years. Its adoption by many state highway departments has resulted in a wonderful improvement of earth roads, and its adoption in cities will accomplish the same result.

One man with a wagon and team, equipped with these various tools besides the usual hand tools, such as shovels, picks, hammers and

saws, should easily take care of a district containing from three to five miles of earth road. His duties are to keep the ditches and gutters clean, to grade or drag the streets when needed, and keep his district in first-class shape at all times.

Binders and Dust Preventives

When this is accomplished, the use of surface applications such as road oil or calcium chloride is an aid to the retention of smooth roads. A good grade of road oil applied when the road is in proper condition serves as a waterproofing and binder, while calcium chloride is chiefly a moisture retainer serving to keep the formation of dust to a minimum in dry weather.

Money is often wasted by the application of road oil at the wrong time, and a great injury done to the road surface as well. Oil should be applied in the spring after the road has been properly shaped and dragged, and before dust has begun to form. If this is done, the street may be expected to shed water quickly and remain smooth throughout the season. Oil applied over ruts or deep dust does not accomplish the results which are normally expected of it, and thus money is oftentimes wasted. Road oiling has proved of great benefit to many roads, and has warranted the expense of application, even though its period of service is but eight or nine months.

Intermittent freezing and thawing of the road-bed during the winter and spring months often "takes the bottom out" of the roads, and destroys the oiled surface. Oiling, therefore, must ordinarily be done over each year, preceded by the usual grading or dragging of the street to secure a smooth surface.

Cinders for Filling-in

Where cinders are available at low cost, a very good surface for a moderate traffic can be secured. In many towns, however, the cindering of streets is done chiefly when they are practically impassable, filling mudholes, deep ruts, etc., throwing the taxpayers' money into the mud, and getting little finally to show for it except a mixture of cinders and mud and a few temporarily satisfied or placated citizens. Half the amount of cinders and labor applied when roads are passable, after the road is graded and dragged, will accomplish much more to provide a road surface which will give better and longer service.

All of the foregoing, however, cannot prevent earth streets from becoming impassable at certain times during the year. Rains, freezing and thawing, excess water in the soil, and inadequate drainage sometimes combine to make the best of earth roads or streets seemingly have no bottom, but constant and careful attention will prove worth while in their maintenance.

Standardized Road Signs in England

Ministry of Transport Adopts New Warning Signs for Use Throughout England, Scotland and Wales

THE new British Ministry of Transport, deriving authority from Section 24 of the Highways Act of 1835, early this year sent a circular letter to county councils, county boroughs, county burghs, borough and burgh councils, district committees and urban and rural district councils, and other highway authorities throughout England, Wales and Scotland, calling to their attention a new set of road signs for adoption throughout the British Isles.

Practically the same signs were sent out as standard in March, 1904, when a circular letter was sent throughout England, giving details as to the size, shape and color of certain symbols for road signs, which had been jointly recommended for adoption by the County Councils Association and the Association of Municipal Corporations. In this circular letter the Local Government Board stated that if the recommendations of the Association were carried out, it would not be necessary for the Board to issue regulations upon the subject. It is a matter of common knowledge that although the signs recommended by the Local Government Board in 1904 have been extensively adopted, a great variety of other signs and warning posts, both official and unofficial, have been placed along the highways. The confusing information presented by such a variety and number of signs has created a tendency among road users to disregard them. The Ministry of Transport has decided that this tendency can be corrected only by the general use of one approved series of standard signs, to which road traffic would readily become responsive, with resulting increase in safety to the traveling public.

The signs are divided into three classes: (1) road direction posts; (2) warning signs and notices; and (3) village and place name signs.

Road Direction Posts

The careful selection of the most suitable position for the road direction sign is of great importance, so as to secure the maximum visibility on all roads of approach. It

is generally undesirable to mask the lower portion of the post in hedges or shrubs. Instead, the full length should be visible whenever possible. The direction arms should not project over the roadway.

It is suggested that the direction arms be set at such angles on the head of the post as to insure that each arm will lie along the immediate general direction of the road it is indicating. In all cases the lower arms should indicate the more important road, and only the arms indicating the same road should be set in the same horizontal plane. The length of arm for new direction posts is mainly dependent upon the number of letters in the longest place name.

DIMENSIONS AND DETAILS RECOMMENDED FOR STANDARDIZATION

- | | |
|----------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| (a) Height of arms from ground | Minimum, 8 feet
Maximum, 9 feet |
| (b) Length of arm, including route number (variable) | Minimum, 3 feet |
| (c) Depth of arm | Minimum, 7 inches |
| (d) Separation between arms | Minimum, 3 inches |
| (e) Lettering, black block letters raised $\frac{1}{8}$ -inch on a white ground: | |
| For single line | 3-inch letters |
| For double line | $2\frac{1}{2}$ -inch letters, $\frac{1}{4}$ -inch space between lines |
| (f) Post | Painted plain white |
| (g) Route numbers | 4-inch block figures, raised $\frac{1}{8}$ -inch, in panel at end of arms |
| 1st class roads—Black letter A and figures on white ground | |
| 2nd class roads—Black letter B and figures on black ground | |
| (h) Precedence of routes | Lower pair of arms indicating the more important road |

It is interesting to note that provision is made on each post for the name of the highway authority responsible for its maintenance. In all but exceptional cases the arm is lettered on both sides, the nearest village being given first, and then the next nearest important town, followed by the terminal town if necessary. The mileage is given in figures only, immediately following the name of the place to which it refers, the lowest fraction being one-quarter mile and the distances being measured from the civic center of the town or village. The supporting posts of road direction signs, and also the field of the arms, should be painted white. The border-

ing, letters and figures should stand in relief $\frac{1}{8}$ -inch above the field and be painted black.

Warning Signs and Notices

The Ministry of Transport particularly recommends that the value and position of all danger signs which are at present existent be carefully reviewed and that they be removed, if not found absolutely essential, as the greater the number of such signs, the less their value. Great importance is attached to the careful selection of the site and the placing of the post clear of bushes or other obstructions to visibility, so that the full length of the supporting post is seen. Where a choice of position exists, due regard is paid to the background for showing up the sign. The warning signs which are used include: Speed Limit, Caution, School, Level Crossing, Cross-Roads, Corner, Double Corner, Steep Hill.

The special danger which is to be guarded against is indicated by means of a clear and legible symbol based on the international symbols as far as applicable, together with a clear and simple title in letters 2 inches high upon a vertical plate 12 inches wide and 21 inches long, attached to a post below the danger sign. Cast iron is recommended for the material of which the plates should be constructed, with letters and details in relief; flat enameled sheet iron is not recommended for use in England owing to its liability to damage and defacement by stones. Special attention is paid to the illumination of road signs in towns and areas where street lighting posts exist. The following dimensions and details are recommended for purposes of standardization:

- (a) Height to the under-side of the red danger triangle from ground, 9 feet
- (b) Space between triangle and top of notice plate, 6 inches
- (c) Size of notice plate over-all, 12 inches wide, 21 inches high
 - Upper portion containing symbol, 15 inches in height
 - Lower portion containing text of notice, 6 inches in height
 - 2-inch letters with $\frac{1}{2}$ -inch separation for two lines, $\frac{1}{4}$ -inch margin all round
 - Symbols to be of standard pattern only, as above, or as added to from time to time. To

- be raised $\frac{1}{4}$ -inch and painted black on a white field
- (d) Height of lower edge of notice plate from ground, 6 feet 9 inches. No danger signs to be exhibited without symbols

All danger signs are placed facing approaching traffic and on the near side of the road, which in England is the left. They are located as closely as possible to a distance of 75 to 100 yards from the object of danger or the beginning of the danger zone, and free from any obstruction such as lamp-posts, telegraph poles, trees, etc.

All posts to which signs are attached are painted white and are of iron or other suitable material firmly imbedded in the ground. It is interesting to note that cross-road danger signs are not considered necessary at cross-roads where direction posts are readily visible from both approaching roads.

Village and Place Name Signs

It is generally agreed that it is a great convenience to the travelling public if notices are erected on the main approaches to towns and villages, giving the name of town or village. These name plates are recommended for adoption by the Ministry of Transport where necessary. The plate can also carry the route number of the road upon which it is erected, and the name of the county council, or county borough council. The width or diameter of the supporting post at top and bottom is optional, as is also its design. The following specifications are recommended:

- (a) Height to center of name on plate, 7 feet (minimum)
- (b) Height of letter, 6 inches. To be raised, painted black on white field, down-stroke to equal twice the width of the up-stroke, $1\frac{1}{2}$ inches to 2 inches clearance top and bottom. Route numbers to be in 3-inch letters. Council's title in $1\frac{1}{2}$ -inch letters.
- (c) To be sited on near side of road facing approaching traffic and at a distance of approximately 100 yards or thereabouts from the first houses of the village or town.
- (d) The color of the supporting posts and also the field of the sign should be painted plain white. The letters and figures should stand in relief $\frac{1}{8}$ -inch above the field and be painted black. The color used to denote the name of the highway authority on the sign is optional.

Illustrations of English Road Signs on Page 305

The road signs depicted on the following page may well be studied carefully by American highway and traffic engineers, as the symbols are particularly clear and easily remembered. They cover all needs for warning motor traffic.



**DOUBLE
CORNER**



**STEEP
HILL**



CORNER



**CROSS
ROADS**



**LEVEL
CROSSING**



SCHOOL

B 479 LUTON $4\frac{1}{4}$
LEICESTER $66\frac{1}{2}$

A 744 LONDON $35\frac{3}{4}$

A.349
WELWYN
HERTS C.C.

POST ROUND UP SQUARE IN SECTION

A Slogan for the Community

By Oswald Ryan

MANY American cities have adopted slogans, and many others are looking for them. A slogan is a terse expression of some general or specific merit or opportunity-giving quality of the community, or a pointed expression of a civic standard for quickening some desired quality in the common life of its citizenship.

Two important benefits may be derived from the employment of an effective city slogan. As a medium of publicity it has proved its worth. A city may be widely advertised if it offers a slogan that catches the imagination of the country—as, for example, the advertising phrase of the product that “made Milwaukee famous.”

Another benefit which a city draws from a good slogan is the quickening of forces within its own citizenship that make for community progress. Such slogans as “Do It for Providence” or “Onward, Cleveland!” although wanting in picturesqueness or individuality, may actually bring increased prosperity and larger life because of a quickened sense of social solidarity directly stimulated by it. Such a slogan becomes a rallying cry, calling its citizens to join in the forward march of the city’s progress.

Perhaps the largest group of community slogans are those that proclaim general industrial and commercial opportunities. Thus Albany, Ore., advertises itself as “The Hub of the Willamette Valley”; Easton, Pa., becomes “Easton, City of Resources”; Mississippi’s capital urges the rest of the world to “Share Jackson’s Opportunities”; Galveston, Tex., borrowing the coinage of Robert Louis Stevenson, has become “The Treasure Island of America.”

Another group of cities express their pride in the possession of some particular industry: “Danbury Crowns Them All,” for the hat-making city in Connecticut; Hood River Valley, Ore., is proud of itself as the “University of Apple Culture”; Salem, Ore., claims distinction as the “Cherry City of the World”; Rockwell City, Iowa, is “The Golden Buckle on the Corn Belt”; Schenectady, N. Y., is willing to be known as “The City That Lights and Hauls the World.”

Other slogans suggest natural or cultural

advantages: word comes from Arizona that “The Sun Is Shining To-day in Phoenix,” and of Colorado Springs, Colo., it is said, “She Sits Forever in the Sun.”

Significant Slogans

What are the essentials of an effective slogan? The first requirement is that it shall signify something in particular. One city calls itself a “City of Homes”—but all cities have homes. Another is “The City with a Future”—equally applicable to any city not expecting immediate annihilation.

The second quality is convincingness. Such expressions as “Houghton—Home of Hustle,” “Holyoke Delivers the Goods,” “Grand Rapids Knows How,” quickly become trite and lacking in the persuasive element. In contrast to such slogans is that of Lorain, Ohio, “Where Coal and Iron Meet.”

The use of metaphors is another habit of slogan inventors. Numerous cities call themselves the “Hub” of something, many others are “Queen” cities, and several are “Cities of Opportunity”—which is nothing distinctive in this country. Metaphoric language may be employed with telling effect, as by Chattanooga, Tenn., “The Dynamo of Dixie.”

Originality is another essential. The slogan should not have already been used by another city. Euphony may help a phrase to catch in the memory, and slogans that use alliteration or rhyme—such as “Active, Alive, Alert Alliance,” “Atlanta Always Ahead,” “Seattle, Seaport of Success,” “Boom Hume,” “Ft. Wayne with Might and Main”—are easily remembered, though some of them are wanting in other good qualities. Puns should be avoided.

The slogan which contains these essential elements is not quickly forgotten. Unless it has this power of persisting in the minds of those who hear it or read it, it will fail in its purpose.

When a town sets out to choose a slogan, not only is a “slogan contest” likely to obtain an excellent slogan, but it should stimulate coöperative thought among citizens. It furnishes sound publicity for the city. This method of securing a slogan has been used several times with great success.

Should Boards of Education Be Independent of the City Government?*

ONE of the outstanding problems in American education is the relation of the board of education and the public schools to the municipality of which they are a part. There are many who hold the theory that public education is properly one department of the municipal organization, on an equality, so far as city government is concerned, with the police and fire departments. This theory implies that the mayor or the city council, or some municipal commission to which this power is delegated, shall act upon the budget presented by the board of education, determine the amount which shall be appropriated for the public schools and levy the necessary tax along with the other city taxes. The opposite theory, repeatedly upheld by the courts, is that public education is distinctly a state function; that the state should delegate to the board of education the power to determine its own budget and to levy a sufficient tax; having regard only for state limitations as to the amount of the tax rate.

In this report we have classified all boards of education in three groups—*independent*, *dependent* and *special*. Those which are in no way limited by the local city government but which determine the amount of their budget and levy their own tax are “*independent*.” Such boards may be either elected by the people or appointed by the mayor or other officials. It is likewise possible that the tax which they levy may be certified to the regular city officials and collected along with the other city taxes. Boards which are really subdivisions of the municipal government and whose budgets may be changed by municipal authorities are “*dependent*.”

The Special or Middle Group

One who has not made a study of the problem might suppose that it is a simple matter to classify any board of education in one of these two groups, but such is not the case. There are all degrees of variation, from the board which is completely independent in the full sense of the word, to

those in a few of the Eastern cities whose budget must be passed on, and may be reduced by, as many as three or four different municipal authorities. In this middle group lie those boards whose budgets are not passed upon by the mayor or selectmen but by the entire group of voters assembled for that purpose in an annual town or school meeting. Other boards of education are not dependent upon municipal authorities, but are far from independent in that their budgets must be passed upon by some county or state commission or by some other specially constituted body not related to the municipal government. This middle group which is not definitely independent, and yet is not dependent upon the mayor or some municipal authorities, is called “*special*.” All such boards are dependent, but in a different way and usually in a smaller degree than are those definitely named “*dependent*.”

In this middle group are placed the cities of New Jersey, where the budget must be passed upon by a special board of school estimates; the cities of Oklahoma, where the board is dependent upon an excise board; the Ohio cities whose budgets may be reduced by a special county commission; those New England cities whose budgets must be submitted direct to a town meeting of some sort, and many of the Western cities where some county authority determines the budget. Throughout the classification the fact as to whether or not the board of education was appointed or elected has been disregarded, though it may well be argued that an otherwise independent board whose members are appointed by the mayor and who may be removed at his pleasure is in a very real sense dependent. A classification of boards of education must be either very general or must use at least nine or ten different groupings. For the purpose of this report the first plan seemed desirable.

Forty-Seven Per Cent of Boards Independent

It is accepted by those who have made a study of the problems of public education that boards of education should be inde-

* EDITORIAL NOTE.—From “Know and Help Your School,” the report of a survey directed by the National Committee for Chamber of Commerce Cooperation with the Public Schools, and the American City Bureau.

TABLE 1—BOARDS OF EDUCATION
INDEPENDENCE, ELECTION, NUMBER OF MEMBERS, TERM OF SERVICE AND PAY OF BOARDS OF EDUCATION.

CITIES	Number of Boards			Number of Boards		Per Cent Elected	Median Number Members per Board	Median Years Term of Board Members	Per Cent of Cities All Board Members Paid	Median Yearly Salary of Those Paid
	Independent	Special	Dependent	Elected	Appointed					
Small, Eastern.....	31	26	22	61	15	80.3	7	3	5.3	\$36.00
Small, Southern.....	18	4	8	22	8	73.3	6	4	36.4	40.00
Small, Great Lakes.....	33	28	7	55	13	80.9	5	3	27.1	150.00
Small, Great Plains.....	32	8	0	40	0	100.0	6	3	0.0	.....
Small, Western.....	4	18	0	22	0	100.0	5	4	9.1	140.00
Middle, Eastern.....	9	6	19	26	7	78.8	9	4	0.0	.....
Middle, Southern.....	6	0	5	6	5	54.5	7	4	0.0	.....
Middle, Great Lakes.....	15	11	3	24	5	82.8	6	3	27.6	300.00
Middle, Great Plains.....	7	4	0	11	0	100.0	7	3	0.0	.....
Middle, Western.....	2	3	1	6	0	100.0	5	3	60.0	360.00
Large, Eastern.....	4	5	8	8	8	50.0	9	3	6.3	1,200.00
Large, Southern.....	5	0	4	5	4	55.6	7	3	0.0	.....
Large, Great Lakes.....	2	5	2	8	1	88.9	7	4	14.3	100.00
Large, Great Plains.....	4	0	1	5	0	100.0	7	6	0.0	.....
Large, Western.....	4	3	0	6	1	85.7	7	4	57.1	500.00
Eastern.....	44	37	49	95	30	76.0	7	3	3.8	50.00
Southern.....	29	4	17	33	17	66.0	7	4	20.0	40.00
Great Lakes.....	50	44	12	87	19	82.1	6	3	26.3	180.00
Great Plains.....	43	12	1	56	0	100.0	6	4	0.0	.....
Western.....	10	24	1	34	1	97.1	5	4	26.5	360.00
Small.....	118	84	37	200	36	84.7	6	3	14.6	100.00
Middle.....	39	24	28	73	17	81.1	7	3	12.6	300.00
Large.....	19	13	15	32	14	69.6	7	4	13.6	500.00
All Cities.....	176	121	80	305	67	82.0	6	3	13.9	150.00

pendent. It will be seen in the first column of Table I that 176, or 47 per cent, of those cities reporting have been so classified. Eighty, or 21 per cent, are definitely dependent upon some municipal authority, while 121, or nearly one-third of the cities, fall in the middle or "special" group. Among the geographical groups the Great Plains cities have the highest per cent of independent boards of education. Seventy-seven per cent of the boards in this group are independent, and the city of Milwaukee has the only board which is definitely dependent. The highest per cent of dependent boards of education is found in the cities of the Eastern States. Here 38 per cent are dependent, 28 per cent special, and 34 per cent independent. Because of the prevalence of the county unit of organization in the Western States, very many of these cities, 69 per cent, are classed as "special."

Independent Boards in Small Cities

Among the size groups it will be noted that there is a distinct tendency in the large cities to make the board of education dependent upon municipal authority. Only 16 per cent of the cities smaller than 30,000 are dependent, but 31 and 32 per cent, respectively, of the middle and large cities are dependent; 49 per cent of the small cities, 43 per cent of the middle cities, and 40 per cent of the large cities are definitely independent.

The best interests of the public schools cannot be served in a city where the budget of the board of education may be reduced and remodeled by city officials who have not made a definite study of the needs of the schools. One of the most significant findings of this study is that only one-third of these cities are willing to be handicapped by such an organization of the public school system.

Let us have an end of playing up the shortcomings and drawbacks of teaching. Let us change our tune and play the golden note of the real fun there is in it, and the true-as-you-live satisfaction to be gotten out of it.—C. H. Levitt, Superintendent of Schools, Savanna, Ill.

Forward Steps in Municipal Affairs

Mayors

The Municipal Commission Encourages Good Music

DALLAS, TEX.—The Municipal Music Commission of Dallas is a body nominated by the Mayor in 1919 for the purpose of coordinating all efforts of music clubs, organizations, dealers, etc., towards the perfection and encouragement of high-class music for the community.

September 25, 1919, was proclaimed by the Mayor as "Music Day" in Dallas, at which time the Music Commission sponsored a city-wide celebration, asking the merchants, factories, stores, music teachers, dealers and clubs to coöperate in the observance of the day in such manner as to make all "Think of Music." The furtherance of this spirit has been evidenced during the season by the active and hearty support the Commission has rendered the Dallas Symphony Orchestra, the creation of the Municipal Chorus, the conducting of Music Memory Contests, and an effort to procure a greater and more attractive number of summer concerts for the parks.

One of the most significant acts of the Music Commission is the organization of the Municipal Chorus, comprising two hundred voices, by Mrs. F. H. Blankenship, secretary of the Music Commission, who is also chairman of the Chorus. It is interesting to know that all the professionals in the city are members of the Chorus, the soloists being selected from this body. Rehearsals are held weekly, the Commission supplying the music and meeting the expenses incidental to the operation of the Chorus. The organization is unique in that it has no dues and no fines, but is held together by the loyalty of the members to

the director and the city. The works of the Chorus embrace, so far, "On Sea and Shore," by Sullivan, "Olaf Trygvasson," by Grieg, "Messiah," by Handel, "Hiawatha," by S. Coleridge Taylor, always accompanied by the Dallas Symphony Orchestra under the direction of Paul Van Katwijk, director of both the Chorus and the Orchestra.

The first work of the Commission was an endorsement of the Dallas Symphony Orchestra, which, while not supported or maintained by the Music Commission, has, during the past season, been the recipient of many special attentions from the Commission. A member of the Music Commission is president of the Orchestra, and through that arrangement much has been accomplished to the advantage of both organizations. The proper development of the Municipal Chorus makes it important to have available an orchestra which is able and willing to assist in the rendition of the Chorus programs.

One of the big things the Music Commission has fostered has been the "sing-songs" at the various parks. If one doubts the wisdom of spending the money necessary to put on the sing-songs, he needs but to go to the parks and watch the crowds as they sing, sometimes a popular number, then a patriotic number, a folk song—always using "America." Different nationalities are represented, all singing and enjoying the only universal language common to all—music.

Another splendid feature on the annual program of the Music Commission is the Music Memory Contests among the public school children, under the supervision of Miss Sadie Williams, Supervisor of Music in the public schools. The results of this project have been far-reaching indeed, in that approximately six thousand children from the fifth grade to high school age have had the benefit of the preparation, and the

opportunity of hearing and appreciating music.

Sponsored by the Dallas Municipal Music Commission, and endorsed as the most important step yet taken by the city for the advancement of music, by both commercial and social organizations, the South's first Music Festival was recently held with Dallas acting as hostess. On this program were two concerts by Dallas' own musical organizations: the Municipal Chorus presented the oratorio "Hiawatha," and the Dallas Symphony Orchestra and the Chorus, augmented by choral organizations representing all parts of the state, gave a "massed chorus" concert.

S.AWNIE R. ALDREDGE,
Mayor.

City Managers

Public Utilities Operated Successfully Under Commission-Manager Government

LUBBOCK, TEX.—This city, with a population of 4,051, according to the latest census report, was incorporated under the commission-manager form of government in December, 1917, with Martin S. Ruby as City Manager. The light and water plants of the city were taken over as a last resort to provide service to residents. At that time the finances of the city were in bad shape, its credit was not good with merchants of the town, and foreclosure was threatened by out-of-city creditors.

The total valuation of plants and property of the city totalled \$26,374. The indebtedness totalled \$32,700, plus a large number of minor accounts here and there. On April 1, 1921, the plant and property valuation was \$265,000 and the bonded indebtedness was \$215,000, including \$100,000 street paving bonds. The city's credit is good with every local firm, business house, and all foreign buyers. The plants of the city, including light, water and sewer, are delivering a highly efficient twenty-four-hour service, with rates believed to be the lowest in the state of Texas. Their finances allow for reasonable depreciation and replacement funds, as well as for the retirement of the bonds and the accumulation of a sinking

fund. In addition to all this, they are making a small profit on the investment. The city tax rate is \$1.25.

The light plant has a valuation of \$89,285 and a bonded indebtedness of \$40,000. The monthly income is \$3,890, with an operating cost of \$1,578, upon a rate of 10 cents for the first kw., 8 cents for the next 75 kw., and 5 cents thereafter for lighting. The cooking rate, with 93 customers, is 4 cents for the first 200 kw., and 3 cents thereafter.

The water system, with a valuation of \$48,000 and a bonded indebtedness of \$40,000, is making a monthly profit of \$560 to retire its bonds, allow for depreciation, and make extensions. Its equipment includes a 90-foot tower tank, fed by a Booster pump, motor-driven, from a surface supply tank fed by electric-driven motor pumps from three wells whose pump capacity is 1,690 gallons per minute for 24 hours. This is supplemented by one Fairbanks-Morse direct-connected duplex pump that delivers 1,000 gallons per minute to the mains.

CURTIS A. KEEN,
Executive Secretary, Chamber of Commerce.

City Planning Commissions

A City Plan for Grand Rapids

GRAND RAPIDS, MICH.—On July 21, 1919, the Mayor of Grand Rapids appointed a City Planning Commission of five members. The first year was devoted largely to investigation. The beginning of the second found the organization in healthy shape and endeavoring to obtain sufficient recognition to secure the preparation of a comprehensive city plan.

On June 21, 1921, the City Commission closed a contract with Harland Bartholomew, of St. Louis, to prepare such a plan within two years. Meanwhile the Planning Commission has been increased to nine members, by the addition of four department heads from the city government, namely, the Directors of Public Service and Public Welfare, the City Engineer, and the Superintendent of Parks. It has been given standing as a city department with a full-time secretary employed.

HUGH E. LYNCH,
Secretary, City Planning Commission.



A HOT AFTERNOON IN RESERVOIR PARK, FORT WAYNE, IND.

Artificial Lake Proves Popular

FORT WAYNE, IND.—When this city built its reservoir, it was necessary to raise a high embankment. Earth for this was ex-

cavated near-by, in such a way as to create a shallow lake, which has since become the center of attraction of Reservoir Park.

D. N. FOSTER,
Superintendent of Parks.



WINTER SPORT AT RESERVOIR PARK, FORT WAYNE, IND.



TOURISTS FROM MAINE TO CALIFORNIA MEET IN SALT LAKE'S AUTO CAMP

Recreation Departments

Inviting Camping Ground for Auto Tourists

SALT LAKE CITY, UTAH.—For more than fifty years Salt Lake City has been the half-way house that links the East and the West. First, the gold-seeking caravans stopped there for food and shelter, then continued on their weary way refreshed. Now motor tourists from all parts of the country find a haven of rest and comfort in the fair city on the western slope of the Wasatch Mountains.

This year the City Commission has provided a new and much larger automobile camping ground than the city has ever had before. It is called Walker Field and lies within two blocks of the heart of the business section. The field contains 8 acres and will accommodate 400 cars. It is equipped with water, sewers, arc lights, a wash-rack and hose for car-washing; in fact, with every convenience required by the auto tourist, including even brick ovens for cooking purposes. It was the original intention of the Commissioner of Parks and Playgrounds, who has charge of the grounds, to provide gas for cooking and install meters, but it was thought the brick ovens would be more enjoyable. Fire-wood is furnished free. A commissary building, at which the tourists' larders may be replenished, is located on the grounds.

Signs posted on the whitewashed fence which surrounds the park invite the traveler

to stop and rest as the guest of Salt Lake City. Hundreds of tall shade trees make the place an ideal camping ground, and the visitor is allowed to stay as long as his fancy dictates. Travelers from Maine mingle with those from Arkansas, and the friendliest spirit prevails at the camp. As many as 150 cars have been parked there at one time, representing nearly every state in the Union, and the number is constantly increasing.

SAM K. SMITH,
Assistant Secretary, Salt Lake Commercial Club.

Public Welfare Departments

How One City Is Meeting Unemployment

BRIDGEPORT, CONN.—In May of this year it became quite evident that the usual amount of money appropriated for the item of Out-Door Poor Relief of the city's Charities' Department budget, namely \$24,000, would be hopelessly inadequate for the relief of the large numbers of the unemployed applying for assistance. As a matter of fact, the expenditure for one month exceeded \$50,000. It was decided, therefore, to ask the State Legislature for authority to provide \$300,000 in short-term notes. This authority was granted, the bill providing, however, that the money should be expended "for relief of and to provide work for needy persons in Bridgeport" by a commission specifically appointed by the Legislature.

The Commission, when organized, de-

cided to function through the Department of Public Charities and all applications for relief under this act are made through this department. The department in turn employs the men at work on streets designated by the Department of Public Works and in the parks under the direction of the Park Department, providing the applications are found upon investigation to be in need.

The rate of pay is 30 cents per hour for a nine-hour day. The number of days per week allowed a man varies from two to five according to the number of his dependents. To date more than 600 men have been employed and much valuable work has been done on the grounds and farm of our almshouse, Hillside Home, in grading the streets and in extending and developing park acreage. At the present rate of expenditure, it is estimated that the money will last until December 1.

GEORGE L. WARREN,
Secretary of the Commission.

City Foresters

Akron Acquires a Nursery

AKRON, OHIO.—The city of Akron recently acquired a shade tree nursery containing about 13,000 trees, including some of the best varieties—mostly Norway maples and European lindens, with a few pin oaks, Oriental planes, maidenhair trees and



AKRON'S NURSERY WILL REDUCE THE COST OF TREES TO THE CITY

others. The City Planning Commission ascertained that this nursery was for sale at the extremely low price of \$500, and, after inspecting the trees, urged the city to acquire it. Arrangements were made for leasing the ground for three years.

About fifty per cent of the trees are of planting size. It is proposed to use them for planting in city streets and parks and also to sell them to property owners at a nominal price, to encourage a general tree-planting program. On the recommendation of the City Planning Commission, the city has included in many of its plans for street improvements for the past year the planting of trees in parking strips. These trees have cost from \$2 to \$4 each. It will now be able to supply them for nothing, or at a cost of not more than 50 or 60 cents. There are about 4,000 trees three years old which will probably be transplanted this year to a convenient place in one of the city parks, where they will become the nucleus of a municipal nursery.

C. F. FISHER,
City Planning Engineer.

Child Health Demonstration to Show What a Town Can Do

Mansfield and Richland County, Ohio, have been selected by the National Child Health Council as the scene for a unique demonstration of what American communities can do for the most healthful de-

velopment of their children. This demonstration will cover a period of five years and will deal with children of all ages. It will be directed by Dr. Walter H. Brown, formerly health officer of Bridgeport, Conn.

The Cafeteria Method of Serving Lunch to School Children

By Laura C. Fawcett

Director, High School Lunch Department, East Orange, N. J.

IT is an established fact that the most efficient and satisfactory method of serving large groups of people within a limited time is the cafeteria service. In no other method of serving can many hundreds of people be served so efficiently, at so small a cost, in a short period of time. These facts make it the best system for use in schools.

A tremendous field for nutrition work is found in the study of diet for school children. Most of us have vivid recollections of the cold, unappetizing lunches carried from home or of the cream puffs and doughnuts dispensed by the janitor in the school basement. We have been slow to learn the relation of food to health in the growing child. Too often the stupid child is the undernourished child, and not all undernourished children come from the homes of the poor.

The school lunch room should be considered a necessity in every community where pupils live too far away to go home for lunch. The lunch room should be under the supervision of a trained dietitian, from the planning of the first layout to the planning of menus and the serving of food. If there is a home economics department in the school, the school lunch properly belongs to this department and should be carried on under its supervision.

The lunch room is used for a comparatively short time daily, and, therefore, with the high cost of building and crowded school conditions, must frequently occupy what would otherwise be waste space, usu-

ally the basement or loft. Neither of these is a desirable location, but a trained lunch-room director, if left unhampered, can do much with either space. The kitchen should have her first consideration. It need not be large, but if light and airy and well equipped with approved labor-saving devices, can be the laboratory for preparing food for many hundred pupils.

The counter layout should occupy less space than is usually given to it. Too long a counter is an error found in most cafeterias. In talking with managers of several Western cafeterias where three or four thousand people are served at each meal, I found that in every case their criticism of their own counters was that they were too long. Generally speaking, the more efficient the cafeteria, the shorter the counter space. The school problem is to feed large num-

bers systematically in a short time, therefore the counter space may be divided into two, four or eight units. A single-unit cafeteria will serve about one hundred and fifty in eight minutes; the four-unit cafeteria six hundred in eight minutes. If pupils are sent to the lunch room in two or more relays, twelve to fifteen hundred pupils may be served comfortably in the lunch period of average length.

The original equipment of a school lunch room should be furnished by the board of education. All other costs should come from the receipts. A well-equipped school cafeteria where good food is served at fair prices will never fail to be a success financially.

A Varied Menu for a School Cafeteria

Tomato bisque	\$.05
Roast lamb, mashed potatoes.....	.15
Creamed chipped beef on toast.....	.10
Spaghetti and cheese.....	.05
Fresh spinach timbales.....	.05
Two rolls and butter.....	.05
Ham sandwiches .....	.05
Olive and celery sandwiches.....	.05
Lettuce sandwiches .....	.05
Banana and cherry salad.....	.15
Lettuce-tomato-asparagus salad .....	.15
Fruit jelly, whipped cream.....	.05
Gingerbread, chocolate sauce.....	.05
Ice cream .....	.10
Cocoa .....	.05
Milk (½-pint in bottle) .....	.05
Home-made salted peanuts .....	.07
Milk chocolate .....	.08

Low-Water Bridges in the Southwest

Various Types of Curbs, Concrete Fords and Bridges to Pass Flood Flows

HIGHWAY engineers are sometimes called upon to solve the problem of handling infrequent flood waters which must cross an important highway and for which it is difficult or impractical to make ample culvert provision. Sometimes it is necessary to anticipate that a short section of important highway will be under water during severe freshets because the grade of the highway cannot be established above flood line except at prohibitive expense. Many of the little draws or valleys

lows floods to pass over without injury.

Another form of low-water bridge consists of several short reinforced concrete spans which clear the ordinary dry or low-water flow. These spans are carried on piers which rest either on footings if a rock bed is available, or on a concrete slab when the foundation is sand or gravel. In the latter case an apron or cut-off wall extends into the stream-bed to protect the slab from scour. During high water these bridges are wholly submerged, therefore



A TYPICAL THREE-SPAN, LOW-WATER BRIDGE IN KANSAS

in the Southwest are dry except when a heavy rain occurs, and then they are raging torrents for a few hours. A fairly good bridge or an extra large culvert would be necessary to pass the maximum flood waters without allowing the road to be washed out. In such places what is called a water overpass or low-water bridge is built. This consists simply in grading out the banks to secure a gentle slope down into and out of the watercourse. The roadway is then concreted for a width of from 14 to 16 feet and for a length sufficient to extend above high-water mark on both sides. Wing-walls extend well down, to prevent undercutting by the river. Such a structure is much cheaper than a large culvert and al-

guard-rails or hand-rails are usually omitted to prevent detritus or suspended matter from lodging. In many cases the center of the bridge is lower than the ends.

To the dweller in a flat, well-watered country, a low-water bridge is rather incomprehensible, because of the fact that his native rivers remain in flood for weeks at a time. This is not the case in the Southwest, for during a hard rain few people care to travel, and the average stream becomes a mere creek a few hours after.

Concrete Fords

The Texas Highway Department has adopted a standard design for a concrete ford or "dip." Where concrete dips are

used, they should be designed, so as to provide the required drainage facilities with the least possible obstruction to traffic, either by reason of abruptness of change in gradient of the roadway or by reason of depth of water on the submerged portion of the pavement and the frequency of this occurrence. The concrete dip and the overflow concrete road with its approaches are, however, in the nature of makeshifts, used because available funds are inadequate to build the necessary culverts, approaches, and trestles which would be required in the same locality to provide a dry roadway. The low-water bridge falls in the same class.

During the last four years many concrete roadways, concrete dips and low-water bridges have been built in Texas, a large number of which are open to criticism. At some time nearly every person connected with highway improvement has thought himself fully competent to design and build a concrete dip without any information as to the area of opening necessary for the flow of water, and other essentials which enter into the design of such a structure. In a number of cases the original bed and banks of the stream were followed exactly with concrete pavement, the steepest part of the approaches was almost vertical, and the vertical curves on the grade line at the beginning of the approach were constructed on a ridiculously small radius. There have been numbers of concrete dips which could not be negotiated by an automobile going faster than 10 miles an hour without wrecking the car.

In order to secure the safety of the public and insure a roadway of pleasing appearance, care and good judgment must be applied to the design and installation of the structure. The concrete dip must provide for drainage, so that the depth of the water and its velocity across the roadway will not present an extreme hazard to the life and property of persons using the highway. Where the depth and velocity of the water occasionally assume dangerous proportions, suitable warning signs should be provided. The structure should be built so that it will not be damaged or undermined by the erosion of overflow water. As the lowest point of the dip should allow for the ready pas-

sage of water and drainage of the upstream side of the watercourse, the transverse surface of the road across this point should be a straight line, with the downstream edge from one to three inches lower than the up-stream edge. The ends of the concrete approaches to the dips should extend to a point above the flow line to prevent erosion of abutting road surfacing; and to provide easy traveling, it should be extended to complete the vertical curve.

Some Interesting Instances

In the construction of the Ripley-Fairplain Road, Jackson County, W. Va., it was found that one section of the highway crossed a broad and rather flat valley between two ravines which discharged large volumes of storm water at periods of heavy rain and when snows were melting rapidly. The concrete bridge built at this point carried the roadway at an elevation sufficiently high to bring the pavement just above the ordinary water-line of the creek. Provision for the ordinary storm water was made by a low culvert having three 5-foot openings.

The highway pavement is 16 feet wide and is carried across the opening as an integral part of the culvert without any breaks in the paved surface.

The accompanying illustration shows a typical low-water bridge in Kansas. This construction is quite generally used in the wooded parts of the state, but is objectionable because drift piles up against the bridges during storms. General plans have been drawn up by the Kansas Highway Commission showing the details of construction of this type of bridge in different ways. Concrete piers have been found to be more successful, although some bridges have been built by using concrete piles supporting a concrete cap. The general practice in the use of these bridges is to use a span length of from 14 to 20 feet. The distance from the roadway to the bed of the stream should be greater than 3 feet, although this distance is increased in some cases. The Kansas state laws will not allow a bridge of this nature to be used with a roadway less than 18 feet, as anything less than this would be considered dangerous.

One tree will make a million matches; one match may destroy a million trees. Help protect our forests.

Chamber of ******* Commerce Activities in Public Affairs

Secures Playgrounds for City

FINDLAY, OHIO.—Three months ago the city of Findlay had no established playgrounds for the children of its twenty thousand citizens. To-day, as a result of the efforts of the Chamber of Commerce in co-operation with other local organizations, Findlay lays claim to having two of the best-equipped recreation centers in the state of Ohio.

At the time that the Findlay Chamber of Commerce was organized, in March, 1920, one of the planks of the program of work called for recreation facilities. Yet the original committee of the Chamber found such strenuous opposition on the part of well-meaning, but ill-advised, citizens and on the part of public authorities, that it was deemed necessary to spend the first season in developing educational propaganda. This

was done, with the result that early in the spring of 1921 a committee of women, representing numerous organizations of the city, came to the Chamber and asked it to foster and lay out a plan for playgrounds which would result in establishing the recreation centers this season.

The work had to be undertaken without the financial or material support of the city authorities. Approximately \$1,500 was raised through public subscription to be used in establishing the two grounds. This money was raised in small amounts through donations from the women's and men's clubs, school children, churches and business men. The result was that the interest was spread over a large portion of our citizenship.

The city of Findlay takes particular pride in its north side grounds, which have been



THE CHILDREN OF FINDLAY, OHIO, ENJOYED THE "LANTERN CONTEST" IN THE PLAYGROUND PROVIDED FOR THEM BY THE CHAMBER

changed from seven acres of corn stubble to an equally large athletic ground. On the north side the city is supplied with grounds that include regulation baseball diamonds, tennis courts, volley-ball, basket-ball, fifty-mile track, and quoits. In addition to the regulation facilities, play equipment such as giant strides, swings, sand-boxes, slides, swat-ball, croquet, etc., has been provided. Perhaps the most notable equipment of the north side is in connection with the outdoor swimming pool. An old sand-pit has been improved so that it not only affords an excellent swimming hole, but at the same time adds materially to the appearance of the grounds. The south side ground, although not having an acreage which would permit the establishment of track and the larger games, has practically the same equipment for play as the north side. The mechanical equipment used in these playgrounds was secured from the Everwear Manufacturing Company.

Another rather unusual fact in connection with the Findlay undertaking is that the Chamber has taken the responsibility for the operation of the grounds, rather than merely fostering the initial activity. The supervisors on the grounds are responsible to the Chamber and hold weekly meetings at headquarters. Unique plans have been developed each week, and an attempt has been made to secure the continued interest of parents at the grounds. That this attempt has been successful is evident from the fact that recently, when the north side playground staged a lantern-making contest and held the final meeting in the evening, there were 500 children and 250 parents, or interested groups.

The plan of the Recreation Committee calls for establishing a third ground next season in the southeast part of the city, and improving an old abandoned quarry for a swimming pool in that section of the city. Eventually, the Chamber anticipates that it will turn over to the Board of Education the control and operation of these popular playgrounds.

A check-up of the "man on the street" indicates that the average citizen now appreciates the value of play. One family regularly sends eight children to the grounds on the north side each day.

J. B. ABELL,

Managing Secretary, The Findlay Chamber of Commerce.

Chamber Coöperates with School Department in Americanization Work

SAN JOSÉ, CALIF.—The importance of Americanization work is realized by the Chamber of Commerce of this city, which has actively coöperated with the school department in making good American citizens of the foreign-born residents of the city and county. The school department, in its night school, gives a thorough course in citizenship. At the end of the last course a class of forty-one, having completed the work to the satisfaction of the Federal and school authorities, was graduated with appropriate ceremonies in the presence of several hundred of San José's leading men and women, who thus manifested their deep interest in this important work.

The exercises were patriotic in nature, including both speeches and musical numbers, together with addresses by representatives of the class showing genuine knowledge of American institutions and ideals, and inspired with a spirit of patriotism that might well be emulated by many native-born citizens. Silk honor badges were presented to the members of the class by the Chamber of Commerce; silk American flags by the City Council; and certificates of graduation and proficiency from the Federal Government and the San José schools by Frank S. Becker, U. S. Naturalization Examiner.

F. L. FOSTER,

Assistant Secretary, San José Chamber of Commerce.

County Highway Development Promoted by Chamber

PITTSBURG, KANS.—The vision of years of the people of Pittsburg, Kans., that hard-surfaced highways would run through it in the four directions is now assured and fast being realized. The Chamber of Commerce has been especially active in pushing this development the past year.

Contracts have been made by the County Commissioners of Crawford County for forty miles of this important work and nearly all of it is on the Ozark Trail and Jefferson Highway routes. This new work extends from the county line on the south to the county line on the north, with several small short side roads. The grading, bridge and culvert work is now being rapidly pushed forward and the brick or

concrete surfacing will be done next summer. The only exception to this is one and one-eighth miles connecting with the main street of Pittsburg on the north, which will be surfaced with brick before the coming winter sets in.

Three grading gangs are now at work on the road from Arma to the Crawford-Bourbon county line on the north to push it to completion as rapidly as possible. All the work is on Federal Aid road projects, and eighteen of the nineteen bridges have been completed. By the end of next summer Pittsburg and Crawford County will be able to match any county in the United States with well-constructed hard-surfaced main highways running through it north and south and east and west.

MANDEL SENER,
Secretary, Pittsburg Chamber of Commerce.

Paving Program Helps City and Normal School

DURANT, OKLA.—When the Chamber of Commerce formulated its program of work at the beginning of 1919, far-seeing members realized that the State Normal School could be made worth more to the city than an average-sized factory. This was true because every student from out of the city was of necessity accustomed to do more or less of his trading there. It was therefore determined to make the Normal School better known throughout its territory and to make it more accessible and appreciated locally.

As the Legislature was in session, a committee of sixteen representatives was appointed and sent to the state capital, where it laid the needs of increasing the facilities of the Normal School before the legis-

lators, and thereby secured the appropriation of \$100,000 for a new building.

At home this did much to center attention on the school and was a great help to the Chamber in creating interest both locally and over the district. The next thing done was to plan a continuous advertising campaign for the school, and a sum of money was set aside to carry it on. This advertising campaign consists of display advertisements in the newspapers in the school's district, of display advertisements in a teachers' magazine published by the teachers of the state, and of a regular supply to newspapers of the district of news stories concerning the Normal School and having some definite point of interest to the community in which the particular paper is published.

The Normal School is over a mile from the business center of the city, which makes it rather hard to reach, there being no street car system. As the school has a big auditorium and offers a number of events during the year, which should be attended by the citizens, it has suffered as a result of being so far from the business section and because of the poor condition of the streets and sidewalks.

The Committee, therefore, set to work to remedy the sidewalks and streets. There was a space of about two blocks without sidewalks, and after some difficulty, arrangements were made to bridge this gap.

Next came the paving campaign, and here a real obstacle was encountered, by reason of the fact that the Normal School had been located about eight blocks from the original city limits, with the result that the property between the old city limits and the Normal School remained unimproved. Because



THESE BEFORE-AND-AFTER PICTURES, TAKEN A YEAR APART, SHOW ONE OF THE ACCOMPLISHMENTS OF THE DURANT CHAMBER

of this condition, paving bonds, which are special assessment bonds against the adjoining property in Oklahoma, could not be sold readily to bond buyers. This seemed an insurmountable barrier until it was suggested that the bonds be sold locally. On this basis the City Council created a paving district of the two streets leading to the Normal School, and the bonds were printed and sold to the local banks and citizens who had confidence in their ultimate worth. This ended the struggle, and the paving was laid as illustrated in the picture on page 319.

As soon as paving was assured, another campaign was started to get homes built between the old city limit and the school, with the result that over thirty homes have since been built in this area and there has been an increase in the value of the property and at the same time of the paving bonds. These new residences also provide rooming and boarding places for the teachers and students close to the school.

That the work of the Chamber has been effective has been proved by the following figures: the enrollment has increased from 1,004 in 1919 to 2,418 in 1921; the graduates in 1919 numbered 43, and in 1921 they totaled 128.

The Chamber has conducted "Know the Normal" tours, taking large groups of citizens out to visit the school at various times. It promoted the organization of a stock company which built a dormitory for girls and has done many other things to build up the institution.

A. B. DAVIS,
Secretary, Durant Chamber of Commerce.

City Tax Rate Reduced

OAKLAND, CALIF.—The Tax and Budget Committee is one of the permanent institutions of the Oakland Chamber of Commerce.

It was established about seven years ago, functioned effectively until war times, when its operations were suspended, and now has been revived with the national demand for governmental economy.

Its object is to bring about the expenditure of public moneys as a business man would expend them and its method is to apply business principles to the analyses of both municipal and county budgets, to keep watch on assessments so that there shall be the minimum of inequalities and of favoritism and generally to act for the community as the "watchdog of the treasury."

The committee has no set program of procedure. It works as it sees fit best to attain its ends. It may indulge in cajolery or resort to threats. It uses whatever expedient seems wisest, taking the course that will bring results from the political powers that are in control.

The appeal or the demand, as the case may be, is put up to the official budget-makers by the committee as business men seeking to have the public business conducted on a business basis.

This appeal or demand is made, of course, after a complete study of the budget requests has been made, so that the committee is in a position to speak with the authority that comes from an expert investigation of the figures.

On one occasion the appeal was made to the City Council in open session by the committee as a whole. Public interest had been aroused by the judicious use of publicity in the Oakland newspapers. The appeal was effective.

On another occasion the majority members of the City Council were asked to sit with the committee. They did, and several extravagances in the tentative budget were pointed out. The majority councilmen admitted the extravagances and promised their elimination. The tax rate that year was reduced 12 cents.

This year Oakland was faced with the possibility of a high tax rate. Following the fashion prevailing the country over, every department of the city government, and many of the city employes, wanted more money. The budget already had been scaled down to a point where a reduction of 15 cents is possible, with an additional decrease probable.

Some idea of how the committee has worked this year may be obtained from the following questions which were prepared and propounded to the Council as a result of a study of the budget:

Department A employs two stenographers and asks for an extra stenographer for the vacation period. Business houses do not go to this extra expense. Why should the city?

Department B submits an increased estimate for stationery. In view of the decrease in the cost of paper and printing, why?

Numerous requests are made for new typewriters at the market price. Should the

city not get a discount for cash and quantity purchase? Is any refund allowed on the machines?

The Bureau of ——— asks for an automobile and funds for its upkeep. As the business of this bureau is brought to its offices in the city hall, why should its head be furnished with a machine at the public expense?

Department C maintains a large staff to look after the collections of contractors for street improvements and other public work. Should not the contractors themselves do their own collecting, or else pay a sufficient fee into the city treasury to meet the expense of this department?

These are only a few of the numerous questions put to the City Council. That they were effective is proved by the reduction in the estimates noted above.

One thing the committee was particularly interested in, and that was the use of city automobiles. It was found that each department submitted estimates for the upkeep of its machines and that the municipal

garage also submitted similar estimates. Here was a duplication—honestly and fairly made in all instances, but made in ignorance—which was pointed out to the councilmen. Its elimination means the saving of thousands of dollars.

The committee is made up of property owners, attorneys, financial experts, bankers, expert accountants, retail merchants, a former judge of the superior court, an expert on property values and an oil company official. The committee is made generally representative of all classes of taxpayers without its becoming too large and cumbersome.

As soon as the tax rate is fixed, the committee's work will by no means be over. It will devote the interim until the next budget time in a study of the assessment methods, for the committee strongly suspects that certain properties are getting off with too low a valuation and the load is being carried in other quarters.

EUGENE BOWLES,

Secretary, Publicity Bureau, Oakland Chamber of Commerce.

The Most Reckless Motorist Pauses Before This Scarecrow



Courtesy National Safety News

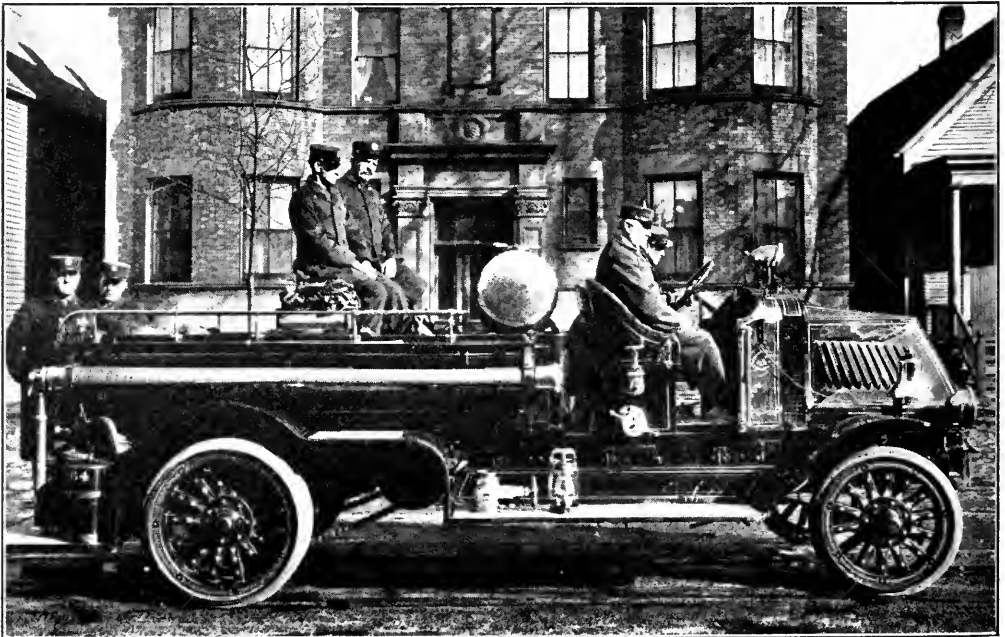
THE REMAINS OF AN AUTO WHOSE DRIVER TRIED TO BEAT OUT THE ENGINE HAVE BEEN SET UP AT A GRADE CROSSING OF THE SAN ANTONIO AND ARKANSAS PASS RAILWAY IN TEXAS, AT THE SUGGESTION OF J. H. NEWBERRY, ONE OF THE COMPANY'S CLAIM AGENTS

Municipal Motor Trucks

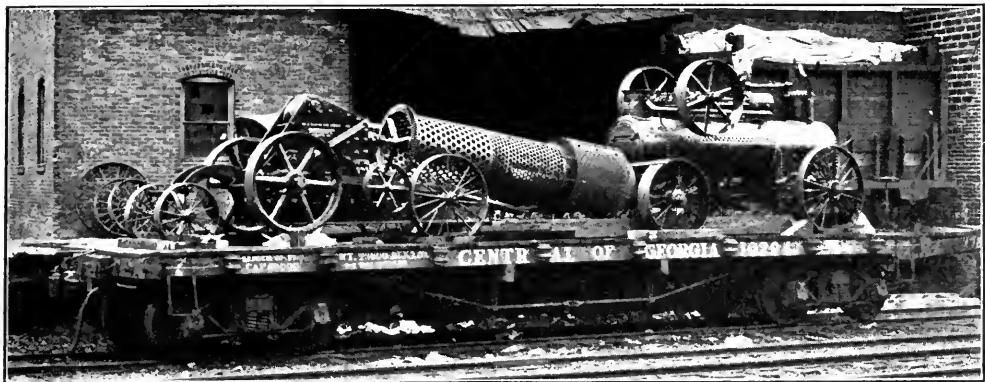


ONE OF DETROIT'S SEVEN NEW PACKARD CHEMICAL AND HOSE TRUCKS

Each truck is equipped with twin standard Oberchain-Boyer tanks of 35 gallons capacity, made of open-hearth flange steel highly finished and chemically treated to prevent corrosion. The tanks are so connected that one can be refilled while the other is being discharged. Each truck also carries one nickel-plated hose reel with 300 feet of 5-ply, 1-inch, rubber chemical hose with $\frac{1}{4}$ -inch tip Larkins patent shut-off chemical nozzle. The chemical box is located on the running board and contains two charges. The hose body has a capacity of 1,000 feet of double-jacketed $2\frac{1}{2}$ -inch fire hose. A nickel-plated brass tube extends from the front of the hose body to the rear step as a safety rail. The truck carries one 16-foot extension rapid-hoist ladder with solid sides and safety locks and one 6-foot plaster hook. Hand holds are provided for six men. In addition to the special apparatus, there are carried two 1-quart Pyrene extinguishers, two Dietz firemen's lanterns and one 36-inch crowbar.



A 500-GALLON MACK PUMPER OF THE CHICAGO FIRE DEPARTMENT



ONE OF A NUMBER OF COMPLETE CHAMPION STONE CRUSHING OUTFITS SOLD TO THE GEORGIA STATE HIGHWAY DEPARTMENT

The plant consists of a Number 4, 9 x 15-inch Champion crusher mounted on trucks, a 22-foot elevator, a revolving screen and a 25-horse-power Farquhar engine and boiler, furnished by the Good Roads Machinery Company



THE DEEP DRAINAGE DITCH SHOWN AT THE RIGHT WAS RECENTLY CONSTRUCTED IN NORMAN COUNTY, MINN.

On a 9-mile stretch, the ditching machine threw out 106,000 yards. This dirt was levelled off and made into a 20-foot roadway in 3 days by a 10-ton Holt tractor pulling a Stockland giant grader



PREPAREDNESS IN TROY, N. Y. TWO OF THE SNOW-PLOWS PURCHASED LAST YEAR TO CLEAN THE SNOW FROM MAIN THOROUGHFARES

Hand versus Mechanical Handling of Coal and Ashes in Municipal Power-Plants*—Part I

By W. F. Schaphorst, M. E.

SINCE the cost of fuel is invariably the greatest item of expense in the steam power-plant, averaging about 70 per cent of the total cost of power, every effort should be made to save fuel—to cut down costs at the source. The efficient burning of coal is a matter of utmost importance.

We can all remember when fuel was considerably cheaper than it is now. Purchasers of coal then endeavored to obtain shipments of the "highest heat value," even though the first cost might be a little greater. High grade coal burns cleaner, gives higher temperatures, higher efficiency, gives less trouble, costs less for freight because it weighs less per thousand units of heat, and leaves a smaller volume of ash to be handled. Because of these important items, it still pays to keep an eye on heat value, but prices have gone up so seriously that the present-day trend is to buy cheap coal even though it may be dirty—coal that in large power-plants requires the use of mechanical stokers for proper firing, proportioning of air, breaking up of the fuel bed, etc. Coal prices, we are informed, will never return to the pre-war level.

Before the war it was not uncommon to read of debates before technical societies and in our engineering schools on the subject, "Which is the more economical—hand firing or mechanical stoking? To-day there is very little question about it. Even with high quality coal the stoker is now preferable over hand firing, and with low grade, cheap coal, mechanical stokers are almost a necessity. Most types of stokers have already passed through the experimental stage, hence it is known beforehand just what a given stoker will do under a boiler. The saving of coal over hand firing can be closely predicted. Hand firing is gradually giving way to stoker firing in all fields where steam power is used.

The advantages of the use of automatic stokers in place of the hand-firing method are briefly as follows:

1. Labor is almost invariably saved in plants larger than 500 boiler horse-power. The larger the plant, the greater the labor saving.
2. The stoker removes the uncertainty of the human labor element. It is independent of the physical ability or the mental attitude of the fireman or his assistants.
3. Fuel is saved. This saving varies with the kind of fuel burned and the size of plant. The larger the plant, the greater the saving.
4. Cheaper coal can be burned on the automatic stoker. This results in considerable money saving during the life of the stoker. This saving must, of course, be much more than the initial cost of the stoker to make the investment worth while.
5. It is more difficult to obtain smokeless combustion with hand-fired furnaces than with stoker-fired furnaces.
6. Boiler capacity and boiler efficiency are both increased.

Many engineers of to-day, as well as officials of municipal power-plants, are still under the impression that plants of a capacity of 500 boiler horse-power or less cannot show sufficient returns on the investment to warrant the installation of stokers. This, however, is not necessarily true. A number of automatic stokers are in operation to-day having a capacity of less than 500 boiler horse-power, and they are operating profitably. In some instances the boiler plant consists of a single boiler and a single stoker. In plants of this small size, where an operator is needed anyway, the small amount of attention required by the automatic stoker permits the operator to profitably devote most of his time to other more essential duties.

In a hand-fired plant one fireman can handle not more than 500 normal boiler horse-power properly, while with automatic stokers one fireman can efficiently handle from 5,000 to 7,000 boiler horse-power, and even more.

Regarding the comparative efficiency of hand firing versus stoker firing, where exceedingly great care is taken in firing by hand, as is usually the case under test conditions, it has been demonstrated that hand firing is just as efficient as stoker firing, or so nearly so that the difference is scarcely

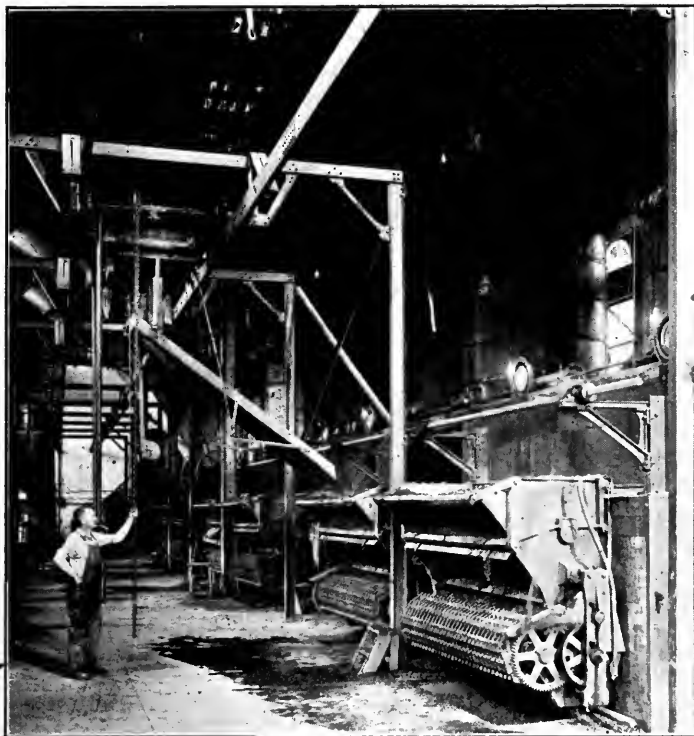
* Copyright, 1921, by W. F. Schaphorst.

distinguishable. For example, six tests were made on hand-fired boilers and the following combined efficiencies were obtained: 71.8, 72, 71.3, 75.6, 68.9 and 72.67 per cent. Seven tests were made on stoker-fired furnaces with the following combined efficiencies: 72.0, 74.9, 74.9, 70.9, 76.1, 73.8 and 73.5 per cent. In these tests the stoker-fired furnaces show an average of 73.7 per cent, while the hand-fired furnaces show an average of 72 per cent, a difference of only 1.7 per cent in favor of the automatic stoker method.

Under boilers of large capacity, stoker firing invariably shows a worth-while saving as compared with hand firing. It is physically impossible for human beings to fire the furnaces under large modern boilers at all, quite aside from doing it efficiently. A grate depth of 6 to 6½ feet is the limit for the average fireman. However, it has been demonstrated that even where capacities are low the stoker often excels over hand firing. The following test data resulted from a test where every-day conditions prevailed. No special preparations were made for the test. The hand-fired boiler was operated at 93.8 per cent of rating and the stoker-fired boiler at 107 per cent of rating.

	Hand-fired Boiler	Stoker-fired Boiler
Water evaporated per pound of coal	9.53	11.2
Equivalent evaporation per pound of coal.....	10.60	12.2
Temperature of up-take gases..	473	401
Rated boiler horse-power.....	277	287

The stoker (which was an underfeed type) saved 15 per cent of the fuel, or more than a ton to every seven tons hand fired. It is therefore plain that, regardless of the smallness of the plant, the automatic stoker must not be entirely ignored. In small municipal plants stokers are not always ad-



INTERIOR OF THE BOILER ROOM OF THE OMAHA, NEBR., WATER-
WORKS, SHOWING LARRY DISCHARGING COAL FROM OVERHEAD
BINS INTO HOPPERS OF THE CHAIN GRATE MECHANICAL STOKERS

visable, but if the fuel-saving item will be large, or where it is necessary that there be no smoke, stoker installations are advantageous.

A prominent consulting engineer in Boston recently wrote a report in *Power* on a large power-plant that was converted from hand firing to stoker firing. He said, "The equipment installed has thus far shown a saving in cost of labor of 40 per cent and a saving in coal per week from 12 to 14 per cent."

With stokers, cheaper fuels may be burned giving higher efficiencies than may be obtained with hand-fired furnaces using higher quality fuel. Hand firing is always intermittent, whereas with a stoker the firing is continuous and even—hence the higher efficiencies. Also, with hand firing the doors are constantly opened and closed, giving a variable air supply, which of course tends toward inefficiency. On the other hand, with stoker firing the air supply is constant and can be almost perfectly regulated. In fact, not only can boiler efficiencies be increased with stoker firing, but boiler capacities can be increased, giving as



Godfrey Conveyor Storing Coal at City Gas Plant, Elkhart, Ind.

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Coal is unloaded from car and placed in storage, conveyed direct from car to boiler room or reclaimed from storage to boiler room—all with the service of only **ONE MAN**. The same system is also used to carry ashes from pits in boiler room to outside receiving tanks or dump pile.

The savings effected from "Godfrey Service" have in the majority of plants paid for the cost of the equipment in from 12 to 16 months.

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Release cars promptly
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Unload store and reclaim**

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high efficiencies at overload as is possible at normal load with the best possible hand firing.

Like other mechanical devices, the stoker, of course, has its disadvantages as well as advantages. Among the disadvantages we have these:

1. Greater up-keep cost. The up-keep cost is usually higher than for hand-fired furnaces because of the moving parts and the greater complexity.

2. Greater first cost.

3. With stokers it is almost impossible to prevent loss of unburned fuel into the ash-pit. This loss may be greater with one grade of coal than with another, because no stoker has yet been made that will take care of all grades of coal satisfactorily.

4. Stokers are not "absolutely automatic." The writer knows of no so-called "automatic device" that is really automatic. Human attention is always needed at some time or other. The mechanical stoker requires human attention, consequently in small plants a stoker may be installed at an actual loss.

5. Generally, stokers should not be installed unless it is also decided to handle ashes and coal automatically.

6. Trouble is sometimes experienced in the coal hoppers of automatic stokers by packing and arching the coal in such a way that it ceases to flow and the coal is fed irregularly or is cut off altogether. To correct this it has been necessary to employ manual labor to see that all stokers are properly operating. It has recently been found, though, that by installing power-operated agitators near the base of the hoppers this trouble is very much reduced.

Types of Stokers

In general, there are three types of mechanical stokers:

1. Overfeed stokers
2. Traveling grate stokers
3. Underfeed stokers

Overfeed Stokers

In the overfeed stoker the coal is fed, as the name suggests, over the top of the grates. The grates are given a slight reciprocating motion, which causes the coal to travel with the aid of gravity in a downward-inclined direction to the dumping-grates. A fire-brick arch assists in coking the coal at the top of the furnace. These stokers are varied in design by feeding coal from the front of the setting or from the side walls. The final result, however, is usually the same.

This type of stoker is used less than the other two types. It has fewer advantages, does not so readily permit the use of forced draft, is more liable to smoke, burns with a

longer flame than the underfeed, gives off less radiant heat, clinkers form and may give trouble, and dumping must be carefully watched.

Very often, though, the overfeed type is chosen because it operates on natural draft. One of the most popular designs is the so-called "opposed type," which feeds coal from opposite sides simultaneously. At each side of the furnace extending from front to rear are coal magazines into which the coal is introduced. As the coal leaves the magazines it rests for a short time upon coking plates, where the volatile gases are driven off. Then the coal moves down the movable grates to the rotating clinker grinder at the center of the grate, this grinder being located in the lowest point of the "valley" to which the coal moves simultaneously from both sides. Exhaust steam is usually admitted to the lower end of the furnace to soften the clinker, to assist in the cleaning, and to lengthen the life of the furnace parts. It is claimed by the manufacturers of this stoker that it "burns any fuel that has heat in it" and that "not one penny is spent for draft."

Traveling Grate Stokers

This grate continuously travels in one direction from the front to the rear. It really is nothing more or less than a metallic belt moving around sprockets, the sprockets being located at the ends—front and rear. As this grate moves along, coal is fed onto it from a hopper from the front, the rate of feeding therefore being constant. Ignition takes place at the ideal point—close to the front. A very large percentage—almost 100 per cent—of the surface of the fuel bed is incandescent. By the time the glowing coals reach the rear end of the furnace, provided the rate of movement of the stoker is properly regulated, combustion is completed and the clinkers and ash drop into the ash-pit always provided at the rear end. Automatic dumping grates are sometimes placed at the rear end of traveling grate stokers to make certain that there will be no air in-leakage at this point.

The principal advantages of the traveling grate stoker are:

1. Automatically and continually feeds itself.
2. Can be easily removed from the furnace during shut-down periods for repairing or for inspection.



& ORNAMENTAL BASES

King Trolley Pole Brackets and Ornamental Bases created by the General Electric Company and equipped with the G-E Novalux fixtures are doing duty at Green Bay, Wisconsin. The design of the base is such that an individual transformer can be placed on the sidewalk adjacent to the trolley pole, thereby keeping the high voltage under ground. King "White Way" engineers are available to solve your lighting problems.

KING MANUFACTURING COMPANY
53 WEST JACKSON BOULEVARD CHICAGO, ILL.

3. Parts are interchangeable and are easily, quickly and inexpensively replaceable.
4. The up-keep cost is comparatively low.
5. A very good stoker for burning coal of low grade, especially coal that carries a high percentage of volatile substance.
6. Adaptable for use in connection with forced draft. Although the underfeed stoker has heretofore been, and perhaps still is, preferable for use with forced draft, successful applications of forced draft are now being made to the traveling grate types of stokers.

The Underfeed Stoker

This type of stoker has recently made rapid headway. As its name suggests, the coal is fed from beneath the grates, the coal being forced into position by reciprocating plungers, or by means of a screw. As in the overfeed stoker, the grates are given a slight reciprocating motion to provide air passageways and also to move the coal along down the sloping grate to the dead plates or to the ash hopper, where the ashes are deposited. Underfeed stokers, like overfeed and traveling grate stokers, are made in various designs.

Let us consider the principal advantages of the underfeed stoker. The coal being fed from beneath is heated and coked before it reaches the incandescent fuel; consequently, the volatile gases are driven off and pass through the incandescent bed, where they are consumed, thus getting rid of the

smoke. It is an excellent stoker for smokeless combustion.

Since green coal is not thrown on top of the incandescent fuel bed, there are always hot, glowing, incandescent coals on top, continually giving up radiant heat energy to the boiler; 100 per cent of this area gives up radiant energy. As pointed out in a previous issue of *THE AMERICAN CITY*, in connection with the selection of steam boilers, radiant heat is a very important factor.

Heavier fires can be carried on the underfeed type than on other stokers. Higher temperatures are usually developed in furnaces where underfeed stokers are used. The higher the temperature, the greater the amount of heat radiated into the boiler. One serious objection to high temperatures, however, is that clinkers will form more readily, or the brickwork may be harmed by the high temperature unless the draft is properly regulated.

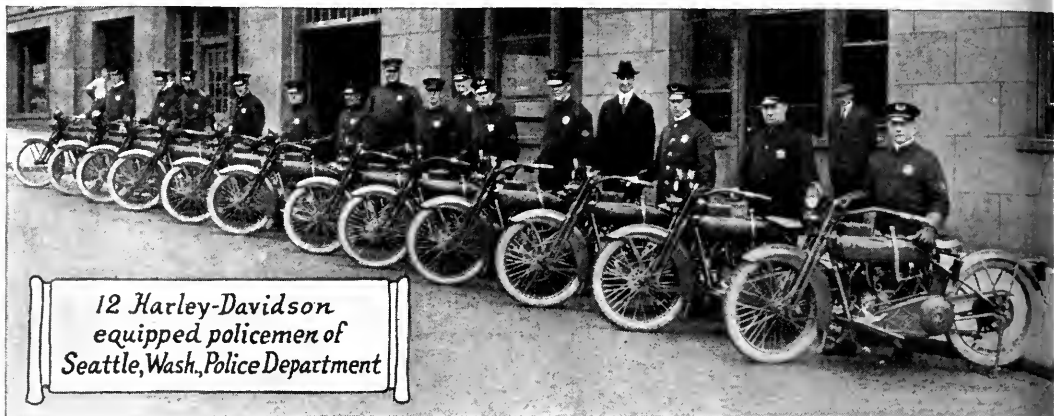
On account of the thickness of coal carried on underfeed stokers, forced draft is almost a necessity and is generally used. A slight suction draft is also recommended. In spite of the thickness of the fuel bed, however, difficulty is seldom experienced in supplying air to the furnace, because of the fact that the fuel bed is continually broken up and continually agitated in the proper direction by means of the screw or plunger feed, whichever is used.

(Continued in the November issue of THE AMERICAN CITY)

Stop Burning Up Homes

The housing problem is one of the great issues of the day. All unnecessary construction was forbidden during the war, and now that the restrictions have been withdrawn, the high prices of materials and labor and industrial troubles have tended to reduce the amount of building. In many industrial centers newcomers are unable to get houses to live in, rents have gone up, and the situation has become so serious that state and municipal commissions are seeking a solution.

Why not stop burning up the existing buildings if there are not enough to go around and more cannot be built under existing conditions? Thousands of homes are burned each month, most of them through carelessness. If housing is so important, if homes are so hard to find, why not be careful with those that we have? Apply fire prevention methods. Be careful about matches, smoking, lighting and heating apparatus and gasoline. Clear out the rubbish, inspect the flues, watch the shingle roofs. Conservation is the order of the day, and if the shortage of dwellings will cause householders to be careful about the fire hazards of their homes, one criminal cause of that shortage will be greatly reduced.



12 Harley-Davidson
equipped policemen of
Seattle, Wash., Police Department

—and Now Seattle Has Changed to Harley-Davidsons

Motorcycles are not new to the Seattle, Wash., police department. But only recently, 12 Harley-Davidsons have taken the place of the machines previously used in this progressive western city.

Hundreds of American cities have found motorcycles indispensable for police work. For running down speeders, regulating traffic, enforcing parking rules, chasing "motorized crooks" and for emergency work of all kinds, a Harley-Davidson soon pays for itself. Its wonderful durability and proven economy make it a most profitable investment for the city.

A few of the 100 or more cities using Harley-Davidsons for police work: Kansas City, Buffalo, Pittsburgh, San Francisco, St. Louis, Portland, Ore., Milwaukee, New Orleans, Fl. Worth, Bridgeport, Conn., Newark, Providence, R. I., Worcester, Mass., Denver.

You'll be surprised at the low upkeep cost of a Harley-Davidson and the variety of its uses for city service. Ask your local dealer for demonstration and the *new reduced prices*. Or write us for special literature on police use of Harley-Davidsons in many American cities.

HARLEY-DAVIDSON MOTOR CO.,
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Prices Down 25%!
Model J. Now \$365 (was \$485)
Similar reductions on
all Models and sidecars

Harley-Davidson
World's Champion Motorcycle

Relief Map Shows Municipal Need for Red Cross Agencies

HOW many of these Red Cross activities have you in your city? This relief map designed by Walter Storey, Director of Exhibits of the American Red Cross, tells at a glance the chapter work which should be established in every ideal municipality.

First there is represented the headquarters of one of the Society's active chapters, where volunteers meet to make garments for home and foreign relief. Conveniently near is one of the 260 health centers, at which last year 258,710 students enrolled for the Home Hygiene and Care of the Sick courses.

Since 5,113,090 boys and girls are enrolled, the school is the field for the Junior Red Cross.

One of those 1,335 public health nurses who are employed by chapters is visualized for us, wending her way in a speeding automobile upon some of the 1,144,692 visits which she made to patients last year. In another section of this ideal municipality the map depicts the Red Cross Home Service worker visiting the families of world war veterans to adjust financial and other difficulties. Home Service workers are employed by 2,397 chapters.

And, because every Red Cross chapter is organized to deal with disaster relief, the map illustrates the aid which would have been dispatched to your city if it had been visited by one of the 70 disasters to which the Red Cross responded during the 18 months from January, 1920, to July 1, 1921.

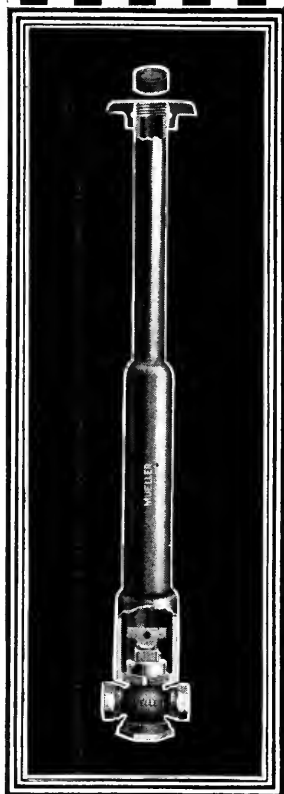
Many cities do not have government institutions and military encampments near them. The total of hospital and government institutions for disabled men in this country is 1,692, and in these institutions 448 Red Cross workers are employed. Besides this number, Red Cross headquarters serves 264 Army and Navy establishments. But the cities which are near any of these military activities should have Red Cross workers for the soldiers—the Red Cross worker who aids and cheers the soldier in camp, and the Red Cross worker who helps solve personal difficulties of the disabled soldier.

Only one item did Mr. Storey forget! He forgot to paint a sign on the map, designating that these are the community activities your membership will help to support when you join the American Red Cross during its Fifth Annual Roll call, November 11-24.



THE RELIEF MAP DEMONSTRATES RED CROSS ACTIVITIES

1. The Red Cross worker in a U. S. public health hospital helps the ex-serviceman adjust his claims, provides recreation for him and, through his home Red Cross chapter helps in his absence to solve his family problems. 2. A Red Cross home service worker's main task is to help do for the family of the ex-serviceman those things he would do if at home. 3. Red Cross relief by train or truck starts at the first flash of disaster news. 4. A Red Cross public health nurse helps the sick to get well and the well to stay well. 5. Red Cross chapter headquarters. Here volunteers make garments for home and foreign relief. 6. Red Cross center, where instruction is given in home hygiene and care of the sick, selection of food and first aid. 7. In the public school are carried on the activities of the Junior American Red Cross. 8. The Red Cross worker in the camp gives aid and cheer to the men in service.



MUELLER Improved Extension Service Boxes

This **MUELLER** improvement over the old type screw adjustment box, permits the raising or lowering of the upper section without injury to the curb cock or service.

The large case insures stability — the lid is practically indestructible—yet the materials used give excess strength coupled with lighter weight—effecting a decided saving in freight.

Made with 1¼", 1½" and 2" upper sections, they will accommodate a range of water or gas curb cocks from ½" to 2", as desired.

MUELLER Service Box Repair Lids are easily attached, and when applied make the old box better than it was originally. Many new boxes are now ordered equipped with **MUELLER** Repair Lids.

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Mail orders given prompt attention.

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Are the Citizens of Your Community Keeping These Points in Mind?

THE productive citizen must finally have developed as a result of his inheritance and his training certain civic attitudes. The good citizen has the disposition:

To act loyally.—The habit of loyal action touches and controls one's attitude in respect to himself, his convictions, and his traditions, and his relation to his home, family, associates, occupation, and country. It should enter largely into every social relation.

To coöperate.—The spirit of coöperation includes good will, readiness to give and take in the activities of life, unselfishness, generosity, obedience to law, desire for intelligent service, respect for both the majority and the minority. It is essential because it is that social disposition which enables the citizen to develop powerful team-play with his fellows with a minimum of friction. As the sound basis of every social relationship, it involves also adaptability, tolerance, and intelligent sympathy, in that it is necessary for relating and adapting one to the necessities of one's environment.

To act honestly.—Honest action is the *sine qua non* of good citizenship. Upon it is based the whole fabric of the social relations of mankind—the prosperity and security of industry and commerce, the comfort and stability of all personal relations, the effectiveness and responsibility of government, and the peaceful and friendly relations of the nations of the world.

To act justly.—The disposition to act justly enables its possessor to form sane attitudes as to principles, persons, and situations; and to act upon the basis of such attitudes.

To work industriously.—Industry, including not only readiness or willingness, but an active desire to participate productively in industrial, social, political, and intellectual affairs, is the basis of economic independence and productive functioning in society.

To live thriftily.—Thrift living should be the twin of industrious living. It includes spending wisely as well as saving wisely. It is essential because it assists in securing economic independence, enhances

creative power, and cultivates the habit of looking forward.

To act tolerantly.—Tolerance or open-mindedness is essential to full social coöperation. It does not mean being indifferent to wrong or injustice, but it does mean the ability to live and let live, to respect the sincere opinions and convictions of others.

To live reverently.—Reverence includes respect in its various forms, such as respect for women, for children, for the aged, for property, for religion, for law, for sanctioned institutions, for sound traditions—the great heritage of the past.

To act responsibly.—The feeling of responsibility with moral conviction is one of the mainsprings which furnish the motive power of the best civic action.

To act independently.—Independent action develops a consciousness of power in one's self, and furnishes a resourcefulness which enables the citizen to sustain himself in thought and action which makes for sound motives, and which develops wholesome pride in the achievements and good character of home, occupation, community, and country.

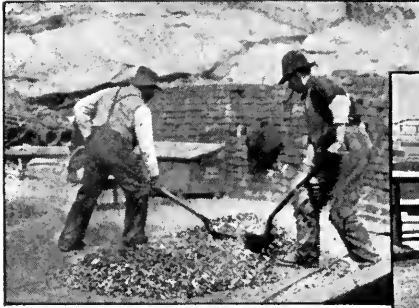
To act self-control.—Self-controlled action serves as a balance-wheel to primitive instinct or irrational impulse. It is a fundamental basis of all good social conduct.

To act kindly.—To apply to all the concrete situations of life kindness and intelligent sympathy, understanding of the problems, difficulties, and necessities of others, neighborliness is essential in making one socially minded, and hence coöperative. This habit tempers and controls the natural selfishness of the individual.

To live creatively.—Creative thought and action constitute prime sources of power which drive men to contribute in a positive, effective way to the welfare of society. The creative instinct is, perhaps, the most impelling of all human incentives.

To live courageously.—Courageous conduct, both physical and moral, is essential in all the relations and situations of life.

ACKNOWLEDGMENT.—From "Education for Citizenship," prepared for the War Department by Professors J. G. de Hamilton and E. W. Knight, of the University of North Carolina.



"Tarvia-KP" and stone are turned over by hand until all stones are coated. Then sand is added.

The hole to be patched is cleaned out and the bottom and sides are painted with "Tarvia-KP."



The mixture of "Tarvia-KP," stone and sand is put in the prepared hole.



A Patch in Time Saves Many a Road—

NOW is the time to fortify your roads against the ravages of winter. Patch the surface breaks, fill the depressions—have your streets and highways in ship-shape condition before the first snowfall.

For winter, with its alternate freezing and thawing will ruin a road, whereas a *little* care *now* may mean a vast saving in actual dollars later on.

"Tarvia-KP" has an astonishing variety of uses. It is employed in patching macadam, asphalt, bituminous-concrete and cement-concrete roads.

"Tarvia-KP" is a material that can be used for patching at any time of the year—it is as serviceable in winter as in summer, for freezing does not injure it. A batch of the mix can be made today and used weeks hence—in fact, aging improves it.

"Tarvia-KP" makes a smooth, perfectly bonded patch—a patch that becomes an integral part of the road itself. A patch that is durable.

There is only one "KP" and that is "Tarvia-KP" patching material made by The Barrett Company.

Our nearest office will gladly send you an illustrated manual of instructions showing each step in patching a road with "Tarvia-KP."



The mixture is well tamped and covered with screenings.



A seal-coat of $\frac{1}{2}$ gallon of "Tarvia-KP" to the square yard is spread over the patch.



Screenings are scattered over the seal-coat and the patch is again tamped.

Tarvia-KP

FOR COLD PATCHING

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BONDING

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TAXATION

The Houston Plan of Valuation and Taxation—Part II

By H. A. Halverton

Tax and Land Commissioner, Houston, Tex.

The Board of Appraisement

THE Board of Appraisement is composed of two commissioners and the Assessor and Collector of Taxes. This board begins its labor as soon as possible after the completion of any of the assessment rolls by the Assessor and Collector, carefully examines the roll or rolls, and properly and equitably adjusts and equalizes the taxable values thereon, and after the completion of this work the Board makes due report of its action to the City Council.

The Board of Appraisement continues for a period of one year and handles and disposes of all disputes arising in the Tax Department relative to values placed on any assessable property against the rendition of the property owner. It is rather a go-between for the property owner and the assessing and collecting department. In case any taxpayer disagrees with the decision of the Board of Appraisers, an appeal from the Board of Appraisement may be made to the City Council, but such an appeal must be in written petition, specifically stating the things complained of, and must be filed with the City Secretary before the expiration of thirty days. The decision of the City Council in all cases of appeal from the decision of the Board of Appraisement is final and binding, and there is no appeal from the decision of the City Council except to the courts of competent jurisdiction.

It is also the duty of the Board of Appraisement to mail post-cards to every property owner whose property values the Board proposes to raise, showing the amount, and notifying him to appear before it and show cause why said valuation should not be increased as proposed, and the fail-

ure on the part of any property owner to present himself to protest against the proposed increase does not in any wise invalidate or affect the action of the Board of Appraisement in increasing the valuation of said property.

Appraiser and Land Calculator

As the public has very little conception of the many details involved in the enormous task of appraising approximately 50,000 parcels of land, the office of the appraiser and land calculator becomes the most important position in the Tax Department. For the information of the Board of Appraisement he is charged with the duty of keeping a complete working unit map, giving the necessary units or acreage values on all blocks or tracts throughout the city.

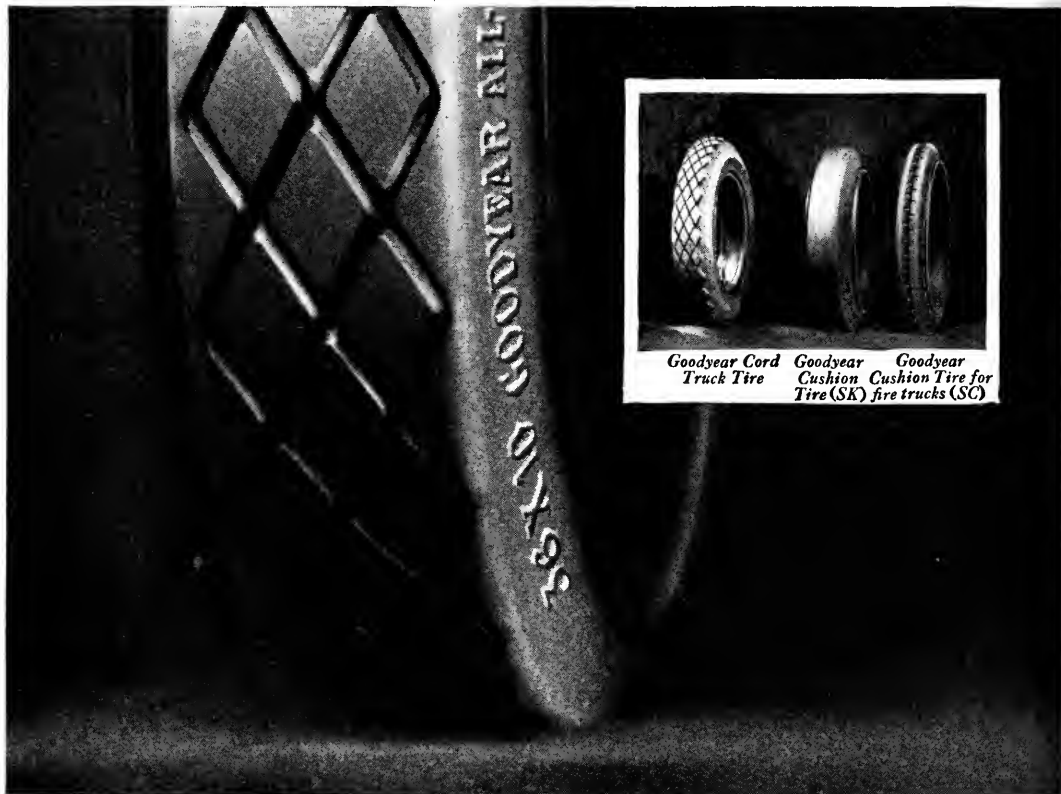
He must show each ownership upon a separate slip, giving the sectional map number, addition, block and lot number, and the name of the owner, and must be in a position to show in detail, when called upon, the method of arriving at the value of the tract, giving the width, the depth, unit value or values, the amount of corner influence, of depreciation, or any other item entering into its value.

Each year numerous acreage tracts are subdivided into lots and blocks. These lots and blocks must be platted upon the unit maps, individual plats made for the block books, and the necessary unit values placed upon them for the next year's valuation.

Transfer of real estate from one owner to another must be posted on the block books against the property transferred, showing the exact description of the property transferred, the date, the consideration,

THE AMERICAN CITY

GOODYEAR



Goodyear All-Weather Tread Solid Truck Tire

Copyright 1921, by The Goodyear Tire & Rubber Co.

The Goodyear All-Weather Tread Solid Tire is a big, strong, resilient tire. It grips the road almost with the ability of a Goodyear Cord. It is thicker than the ordinary smooth tread solid tire. It wears long and it cushions the truck from excessive jolts and vibration. The popularity of the Goodyear All-Weather Tread Solid Tire in municipal service is built solidly on its ability to serve economically and well on heavy duty trucks. For lighter and quicker hauling, Goodyear makes other special tires—Goodyear Cord Truck Tires and Goodyear Cushion Tires.



*Single Jacket
Underwriters Fire Hose*

The Underwriters label on Goodyear Single Jacket Fire Hose and Goodyear Monterey Chemical Hose, means that the latter will resist satisfactorily the biting, corrosive action of chemicals and that both will stand a definite pressure per square inch. Goodyear's years of manufacturing experience has enabled the production of hose on a par with all other Goodyear products—hose which will render dependable and economical service.



Monterey Chemical Hose

and to whom transferred. This gives a good comparison of the assessment with the market value of the property, and shows the owner to whom the assessment must be charged for the following year. If an owner sells part of his holding, this necessitates calculating the value of that which he sold and the part of it which he still owns.

Since conditions in a large and growing city are continually changing as to values, it is necessary that each year the unit values of certain sections of the city be revised, some being increased and others decreased. The value of all lots affected must be recalculated and the new assessments posted to the assessment sheets.

The greatest benefit to the Tax Department from the work of the appraiser and calculator is that every lot or parcel of land is scientifically figured and bears a corresponding relation of equity between one property owner and another.

As soon as the assessment rolls have been completed and all charges entered against the taxpayer, the Tax Department is ready to collect taxes for the current year. A notice is sent to every taxpayer showing the amount of taxes charged against his or her property on the tax rolls for that year, and stating that the tax is due and payable any time between July 1 and December 31 and that this tax must be paid on or before December 31 to avoid the payment of penalties. This notice also bears the receipt number that has already been made out and is ready for delivery, eliminating any unnecessary delay when the taxpayer presents

himself at the office of collector for the payment of the taxes due. The notice facilitates the collection of taxes and, as evidenced by our records, one man can collect taxes estimated in excess of 400 taxpayers in 8 hours.

In conclusion, permit me to say that in my several years of experience and connection with the city government I have always been a member of the Board of Appraisal, and later Tax and Land Commissioner, and I have found that the real problem in taxation is the question of equalization. No thoughtful or fair-minded citizen objects to paying his share of the cost of the operation of the city government when he knows the burden is equally distributed in respect to his fellow citizen.

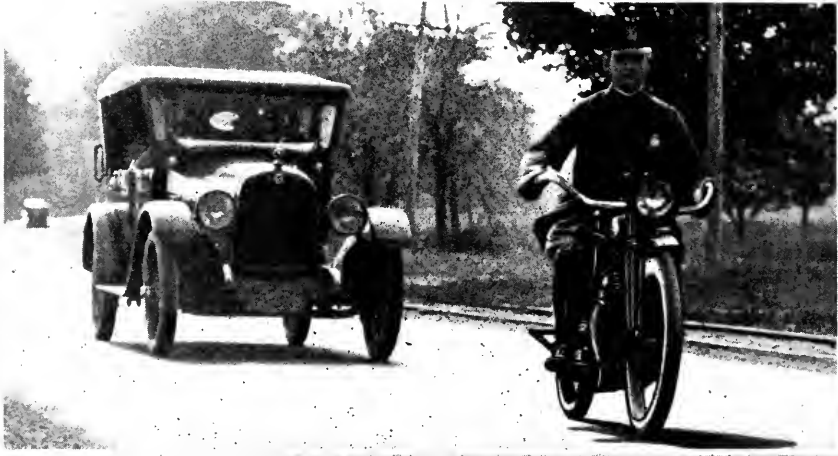
Experience has conclusively shown that coming into personal contact with the head of the stores or firms has brought about a friendly relation between the merchants and the Tax Department, and 98 per cent of the former give the information sought, freely and voluntarily, when they know they are treated alike.

The present unit system of valuation and taxation has divorced the Tax Department from politics or political influence, for with the proper system of equalization there can be no special friends rewarded nor enemies penalized. It gives to every taxpayer the assurance that all benefits and immunities enjoyed by his neighbor are also enjoyed by himself. This appeals to all with great force and we often hear the pleasant expression, "If you have me down like my neighbor, I won't kick."

Semi-Centennial of American Public Health Association

The fiftieth annual meeting of the American Public Health Association, in New York City, November 8-19, will be the occasion of a Health Fortnight which will include three major divisions; a Health Institute, November 8-11; a Health Exposition, November 14-19; and the fiftieth annual meeting of the American Public Health Association, November 14-19. The Public Health Exposition, at the Grand Central Palace, will be conducted under the joint auspices of the Department of Health of the City of New York and the American Public Health Association. The Health Institute will present the operations of

established methods applied to various phases of public health work. The meetings of the American Public Health Association in celebration of its Semi-Centennial will be at the Hotel Astor, under the following divisions: General Sessions, Public Health Administration, Child Hygiene, Public Health Publicity and Education, Laboratory Section, Vital Statistics Section, Industrial Hygiene Section, and Food and Drug Section. The speakers will include health workers of world-wide repute. Further information may be obtained from the American Public Health Association, 370 Seventh Avenue, New York City.



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Springfield, Massachusetts

The City's Legal Rights and Duties

Information for City Attorneys and Other Municipal Officers, Summarizing
Important Court Decisions and Legislation

Conducted by A. L. H. Street, Attorney at Law

Private Property Benefited by Construction by City of Tunnel for Use of Street Railway May Be Specially Assessed

That a city acting under proper charter authority may validly provide for the construction of a tunnel at the expense of property benefited thereby, although the tunnel is to be used solely for carrying a street railway, is the holding of the California Supreme Court in the case of *Larsen vs. City and County of San Francisco*, 186 Pacific Reporter, 757.

The case involves the construction of a tunnel of this kind in San Francisco, and the Court says:

"The appellant contends that no assessment for the cost of a tunnel for such purposes can be made upon private property; that such a railroad must be the property of a private corporation or of a municipal corporation acting in its proprietary capacity; that if it belongs to a private corporation the tunnel would not be for the public benefit, but would be for the benefit of such corporation, which is a purpose for which a special assessment upon private property cannot lawfully be made, while if the railroad belongs to the municipal corporation, the tunnel would be for the general benefit of the municipality, and the expense thereof could lawfully be met in no other way than by a general ad valorem tax upon all the property within the city. . . ."

"It is not necessary here to determine whether the power to levy a local assessment for the expenses of a public improvement is limited to cases where a special benefit is conferred thereby upon the assessed property or not. It must be conceded that, where there is a particular benefit from a public improvement to the property assessed, the power to levy a special assessment for its cost exists. We are satisfied that the construction of the tunnel here involved is specially beneficial to the property upon which the assessment is levied, to the extent necessary to justify the assessment. The districts assessed, . . . , include a large area southwesterly of the Twin Peaks ridge, and another, but a more limited, area in the neighborhood of the easterly extremity of the tunnel. Without the making of such tunnel the inhabitants of the more remote districts could not reach the city by means of street cars, ex-

cept by a circuitous route involving considerable delay, and means of access to the city was confined to such street car lines and to travel by vehicles and on foot over steep hills. By reason of the construction of this tunnel, and the operation of a street car line through it, they have a ready and speedy means of access to the city, and the resulting benefit to their property is apparent. . . .

"It cannot be successfully contended that such a tunnel is not a public improvement, or that its use is not for the benefit of the public, or that it is not a public use. A public way is for the general public benefit, although not open to all modes of travel, provided it is open to the general public for travel thereon in the manner to which it is adapted."

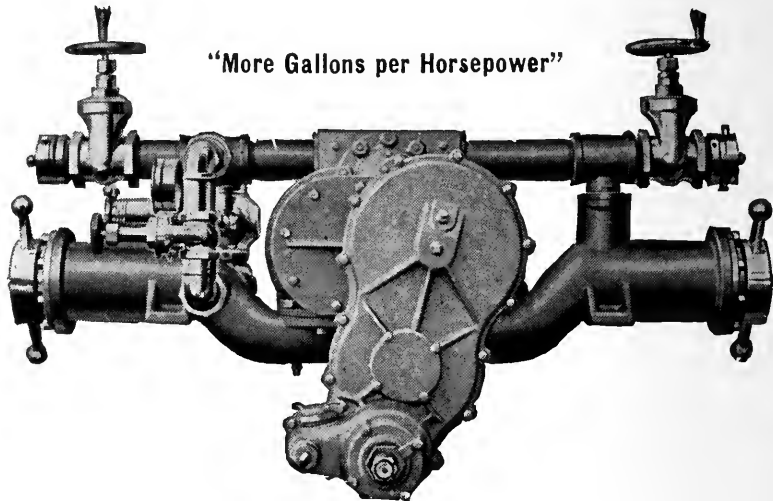
License Tax Upon Manufacturers Held Valid Although Based on Aggregate Sales Including Interstate Business

Whether an ordinance of the city of St. Louis levying against manufacturers, especially as against non-resident corporations, a license tax for carrying on a manufacturing business in that city was void because it based the tax on the amount of sales of manufactured goods, whether sold within or without the state and whether sold in interstate commerce or not, was the question presented to the United States Supreme Court in the case of *American Manufacturing Co. vs. City of St. Louis*, 39 Supreme Court Reporter, 522. And this court of last resort upheld the ordinance, saying:

"The tax is computed according to the amount of the sales of such manufactured goods, irrespective of whether they be sold within or without the state, in one kind of commerce or another; and payment of the tax is not made a condition of selling goods in interstate or other commerce, but only of continuing the manufacture of goods in the city of St. Louis.

"There is no doubt of the power of the state or of the city acting under its authority, to impose a license tax in the nature of an excise upon the conduct of a manufacturing business in the city. Unless some particular interference with Federal right be shown, the states are free to lay privilege and occupation taxes. . . ."

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"The city might have measured such tax by a percentage upon the value of all goods manufactured, whether they ever should come to be sold or not, and have required payment as soon as, or even before, the goods left the factory. In order to mitigate the burden, and also, perhaps, to bring merchants and manufacturers upon an equal footing in this regard, it has postponed ascertainment and payment of the tax until the manufacturer can bring the goods into market. . . .

"In our opinion the operation and effect of the taxing ordinance are to impose a legitimate burden on the business of carrying on the manufacture of goods in the city; it produces no direct burden on commerce in the goods manufactured, whether domestic or interstate, and only the same kind of incidental and direct effect as that which results from the payment of property taxes or any other and general contribution to the cost of government. Therefore, it does not amount to a regulation of interstate commerce. And, for like reasons, it has not the effect of imposing a tax upon the property or the business transactions of plaintiff in error outside the state of Missouri, and hence does not deprive plaintiff in error of its property without due process of law."

Validity of Ordinances Forbidding Doing Plumbing Work Without a License

Upholding a conviction of having violated an ordinance of the city of St. Paul, which forbids the doing of plumbing work without a certificate of competency obtained from the city, the Minnesota Supreme Court notes that the ordinance does not require helpers or apprentices to obtain such certificates, and therefore is not unconstitutional on that ground as unduly restricting the free right to labor. Referring to a decision of the Georgia Court of Appeals (61 Southeastern Reporter, 27), the Minnesota Court observes:

"The Court there concedes to municipalities the right, under the police power, to regulate a business so apt to affect public health as plumbing. No one at this time doubts the proposition. But, of course, a municipality may not under the guise of this power unnecessarily restrict the free right to labor. In that case the person accused was engaged in tearing out old plumbing for the purpose of affording a plumbing firm opportunity to make plans to install new plumbing fixtures, and when arrested he was getting lead out of a hub. It is perfectly plain that an ordinance which by its terms would require a license or certificate for doing such work places uncalled-for restrictions upon labor, and so would a construction of the ordinance here in question forbidding similar work by one not having a certificate of competency." (State vs. Foss, 180 Northwestern Reporter, 104.)

Abolishing Civil Service Positions—Merely Changing Name of Office Does Not Deprive Incumbent of Place

"It is well settled," remarks the Washington Supreme Court, "that it is within the power of the City Council to abolish a position in the classified civil service, and thus separate an incumbent from the service and discontinue the salary thereof." (State vs. City of Seattle, 197 Pacific Reporter, 782.)

But it is decided that J. J. Wettrick, on whose relation the suit was brought, was entitled to a writ of mandamus requiring his restoration to the municipal service where his position as chief engineer in the office of superintendent of public utilities was abolished and a new position, known as railway maintenance engineer, was created with precisely the same functions. The Court said:

"Under the rule stated, if the City Council abolished the office of chief engineer and created a new one with new duties, the relator cannot complain. On the other hand, if what was done in effect was the change of name in the office only, and the duties of the office of chief engineer were substantially the same as those of superintendent of maintenance, the relator's position is well taken."

City May Require Removal of Stationary Awnings from Sidewalks

A resolution of a city council ordering removal of wooden and sheet-metal awnings from the fronts of business houses has been sustained by the Georgia Supreme Court as being valid. In this case (Bailey vs. City of Elberton, 104 Southeastern Reporter, 639) the Court says:

"There is no insistence that the city has not the power to regulate and control its streets and sidewalks. In the absence of such allegation and contention, the contrary is, of course, assumed. The case presented, therefore, is that the awnings in question were erected under an express or implied license from the city authorities. The necessary conclusion is that an ordinance or resolution revoking the license is *prima facie* valid, and that its enforcement should not be enjoined. Unquestionably, an awning of any kind extending over the sidewalks of the city is an encroachment and is to some extent an obstruction, and is an obstruction which the city has the power to remove. . . . The fact that the resolution requires the removal of wooden or sheet-metal awnings only will not of itself authorize this court to declare that the resolution is discriminatory and therefore arbitrary and unreasonable."

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Newport genuine open-hearth iron culverts are guaranteed to last longer under identical conditions than any other corrugated metal culvert pipe. It is made in full-round and half-round types in order that city, county, or state official may have a culvert adaptable to every condition.

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FREE SCHOOLS

Thomas E. Finegan, Deputy Commissioner of Education and Assistant Commissioner for Elementary Education of New York. Published by the University of the State of New York. 682 pp. Illustrated. 1921.

This volume is a documentary history of the free school movement in New York State. The first school was organized in 1638, and the volume, beginning with this, continues the story down through the year 1919. (Apply to the author, Albany, N. Y.)

THE TOWNSHIP SYSTEM

Thomas E. Finegan, Deputy Commissioner of Education and Assistant Commissioner for Elementary Education. Vol. I of the Fourteenth Annual Report of the State Education Department. 1693 pp. Illustrated. 1921. Published by the University of the State of New York.

A documentary history of the endeavor to establish a township school system in New York State from early periods through the repeal of the Township Law in 1918. (Apply to author, Albany, N. Y.)

APPEALS IN ZONING

"The Board of Appeals in Zoning," by Edward M. Bassett, Council of the Zoning Committee of New York. A thorough discussion of the functions of such boards both in New York City and elsewhere. 25 pp. 1921. 25 cents. (Apply to Herbert S. Swan, Secretary, Zoning Committee of New York, 277 Broadway, New York City, N. Y.)

INDUSTRIAL WASTES

"Summary of Report on Industrial Wastes from the Stockyards and Packingtown in Chicago. Made to the Board of Trustees of the Sanitary District of Chicago, January, 1921. 51 pp. Illustrated. (Apply to William W. Smyth, Clerk, Board of Trustees, 910 Standard Oil Building, 910 South Michigan Ave., Chicago, Ill.)

NEW JERSEY ROADS

"The Highwayman," a monthly publication by the State Highway Department, Trenton, N. J. August, 1921, Vol. I, No. 1. Devoted to securing more and better roads in New Jersey. (Apply to The New Jersey State Highway Department, Trenton, N. J.)

HIGHWAY ADMINISTRATION

"The Importance of Business Administration in Highway Affairs," an address by A. R. Hirst, State Highway Engineer, Wisconsin Highway Commission, Madison, Wis., before the Portland Cement Association. 8 pp. 1921. (Apply to publishers, the Portland Cement Association, Chicago, Ill. Free on request.)

THE PHILADELPHIA COMMERCIAL MUSEUM

"Educational Work of the Commercial Museum of Philadelphia," by Charles R. Toothaker, Curator. Published by the Department of the Interior, Bureau of Education, as Bulletin, 1920, No. 13. 28 pp. Illustrated. 15 cents. (Apply to the Department of the Interior, Bureau of Education, Washington, D. C.)

WATER-SUPPLY

"Sources of Water Supply," by J. H. Hoskins, as Supplement 39 of the U. S. Public Health Service. Discusses briefly the factors that should govern the selection and protection of water-supplies. 18 pp. 1921. (Apply to U. S. Public Health Service, Washington, D. C.)

FIRE PREVENTION

"Fire Prevention Day Handbook." Issued by the National Fire Protection Association. 47 pp. Illustrated. 1921. 15 cents. This pamphlet contains suggestions for guidance in planning the observance of Fire Prevention Day, with specific instruction showing the parts which may be taken by such organizations as the chamber of commerce, fire departments, churches, schools, newspapers, and other agencies in close touch with the public. (Apply to Franklin H. Wentworth, Secretary, National Fire Protection Association, 87 Milk Street, Boston, Mass.)

ORGANIZATIONS FOR SOCIAL SERVICE

"Handbook of Social Resources of the United States," by Genevieve Poyneer Hendricks. Published by the American Red Cross. LXXI + 300 pp. 1921. \$1.00. A directory of all national organizations, both sectarian and non-sectarian, thoroughly indexed for ready reference. (Apply to The American Red Cross, Washington, D. C.)

COMMERCIAL SECRETARIES' CONVENTION

Proceedings of the Fourteenth Annual Meeting of the Southern Commercial Secretaries' Association, in Jacksonville, Fla., May, 1921. 145 pp. (Apply to F. Roger Miller, Secretary-Treasurer, Chamber of Commerce, Macon, Ga.)

CITY PARKS IN KANSAS

"Parks and Playgrounds in Kansas Cities." Compiled and mimeographed by the Municipal Reference Bureau, University Extension Division, University of Kansas, Lawrence, Kans. Bulletin No. 26. 16 pp. 1921. (Apply to The Municipal Reference Bureau, address above.)

URBAN TRANSPORTATION

"Investigation of Transportation Services in Western Cities." Report of the Committee on Local Transportation to the Mayor and City Council of Chicago. 1921. (Apply to Ulysses S. Schwartz, Chairman, Committee on Local Transportation, City Hall, Chicago, Ill.)

GEOLOGY OF NORTH CAROLINA

"Limestones and Marls of North Carolina," by G. F. Loughlin, E. W. Berry, and J. A. Cushman. Prepared by the United States Geological Survey in connection with the North Carolina Geological and Economic Survey, and published as Bulletin No. 28. 211 pp. Maps and illustrations. 1921. (Apply to Joseph Hyde Pratt, Director and State Geologist, North Carolina Geological and Economic Survey, Chapel Hill, N. C.)

CITY PLANNING

"The Jersey City Development Plan," prepared by direction of the Board of City Commissioners of Jersey City, by the Board of Engineers. 92 pp. Maps and illustrations. (Apply to Philip Guise, Secretary, Board of City Commissioners, Jersey City, N. J.)

ADVERTISING

"Theory and Practice of Advertising," by George W. Wagenseller, A. M., Lit. M. Fourth and revised edition. 64 pp. 1920. \$1.00. The salient principles of advertising presented in fifty condensed lessons. The appendices illustrate various sizes and styles of type. (Apply to George W. Wagenseller, Wagenseller Publishing House, Middleburgh, Pa.)

Municipal Reports

Bangor, Me.—Forty-sixth Annual Report of the Bangor Water Board, for the municipal year 1920-1921. (Apply to Walter I. Brown, Clerk, Bangor Water Board, Bangor, Me.)

Chicago, Ill.—Report of the Comptroller of the City of Chicago for the year 1920. (Apply to George F. Harding, Comptroller, Chicago, Ill.)

Chicago, Ill.—Report of the Board of Local Improvements. Summary of work for past six years. 1921. (Apply to M. J. Flaherty, President, Board of Local Improvements, Chicago, Ill.)

Chicago, Ill.—Annual Report. Department of Weights and Measures, for the year ending December 31, 1920. (Apply to Morris Eller, Inspector of Weights and Measures, Chicago, Ill.)

East Cleveland, Ohio—Third Annual Report of the city for the year ending December 31, 1920. (Apply to C. M. Osborne, City Manager, East Cleveland, Ohio.)

Montclair, N. J.—Twenty-sixth Report of the Board of Health from January 1, 1920, to December 31, 1920. (Apply to William N. Chestnut, Secretary, Board of Health, Montclair, N. J.)

New York, N. Y.—Annual Reports of the Art Commission for the years 1919 and 1920. (Apply to Henry Rutgers Marshall, Assistant Secretary, Art Commission, City Hall, New York, N. Y.)

St. Louis, Mo.—Annual Report of the Division of Parks and Recreation of the Department of Public Welfare, for the fiscal year ended April, 1921. (Apply to Fred W. Pape, Commissioner of Parks and Recreation, St. Louis, Mo.)

Which Way?



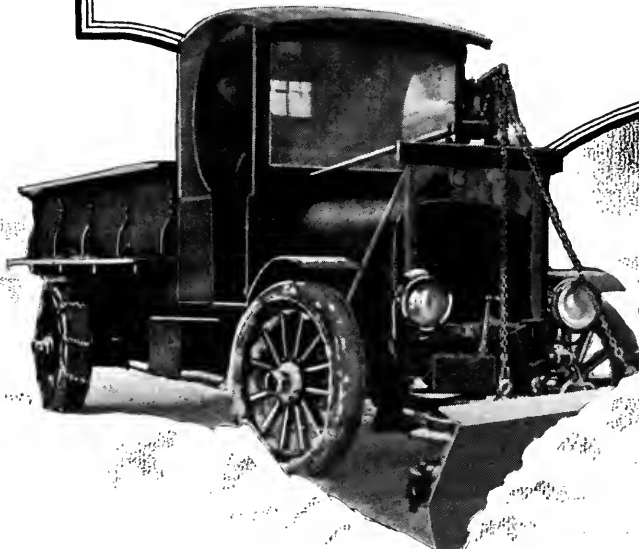
Pick and shovel cannot cope with tons of snow. Only efficient machinery can solve this problem.

WHEN the snows of winter fill the streets and highways, how do you plan to open them so that mail, express, produce and supplies may be properly handled and traffic may not be held up for days at a time?

In February, 1920, New York City was held in the paralyzing grip of a snow blockade for 12 days. The actual money loss to the city due to the interruption of traffic was Sixty Million Dollars. It took twelve days at a cost of five and one-half million dollars to partially clear the streets by the method shown above. In February, 1921, the streets were cleared in 12 hours at a very small cost by the method shown below. Which is the better way?

Without any obligation whatever, we will be glad to send you, on request, our new catalogue of the Champion Snow Plow. It will interest you.

THE GOOD ROADS MACHINERY COMPANY, INC.,
Kennett Square, Pa.



"Champion Snow Plow attached to a Netco Truck, used by the town of Weymouth, Mass."

Methods, Materials and Appliances

News for Boards of Public Works, Engineers, Contractors, Purchasing Agents, and Others Interested in the Economical Construction and Efficient Operation of Public Improvement Undertakings

Boston Fire Department Tests Smoke Masks

Firemen's masks manufactured by the American-LaFrance Fire Engine Company were recently tested in the Boston Fire Department "smoke house," before Fire Commissioner John R. Murphy, Fire Chief Peter E. Walsh, Deputy Chief John O. Taber, and several other fire officials. Commissioner Murphy and the Department officials have given a great deal of thought to the matter of protection for their men, having investigated this subject extensively, taking advantage of coöperation given them by the laboratories of some of the large technical institutions in and around Boston. The object of the test was to demonstrate the exceedingly severe conditions under which these light, simple types of masks could be used by firemen.

The test house is a tight brick and cement structure about 10 feet wide and 12 feet long, with low ceiling and no windows. The entrance has a steel door with wire-glass light. The lack of air circulation made it difficult to keep a large fire burning for long periods, so an opening about 1½ inch in diameter was made under the door and also one in the ceiling. These openings allowed some air to enter until the fire got well started, after which smoke poured from both openings, indicating that fresh air was no longer going in. This practically air-tight test house offers excellent means for testing the more complicated oxygen machines for rescue squad work, but made a very severe condition in which to test firemen's masks, as it is always recommended that firemen working under these same conditions break a window or otherwise provide some ventilation.

The smoke and gas for the tests came from various burning materials and ammonia fumes caused by opening a 50-pound cylinder of ammonia gas during the last smoke test. The fire was started with excelsior and built up with considerable amounts of tar paper to cause heavy black smoke, with oily waste for heat, and powdered sulphur. The materials burned were excelsior, woolen rags, oily cotton waste, tar paper, sulphur and small amounts of leather and rubber. These gave off the following gases: carbon dioxide, which produces headache and dizziness; acrolein, which attacks the eyes and irritates the lungs; also various acid gases which are very dangerous and noxious, such as formic acid vapors, pyroligneous acid, carboic acid vapors, sulphur



BOSTON FIRE DEPARTMENT OFFICIALS PERSONALLY TESTING SMOKE MASKS

dioxide, nitric acid gas, and possibly nitrous oxide. Various organic gases also resulted, such as wood alcohol, oily vapors, etc. All things considered, the conditions in the test house were anything but pleasant and homelike during a fifteen-minute preliminary test. When sulphur was thrown in the fire, the explosive effect made the small room uncomfortable and back-fired out of the small openings, so in the latter tests two large five-wick sulphur fumigating candles were burned and only small amounts of dry sulphur were added to the fire from time to time.

A LaFrance mask with a fire-fighting canister was used by the same demonstrator, J. W. Knoblock, throughout the various tests, which covered forty minutes in all. In addition to this, he spent probably ten minutes at various times in the test house creating the proper smoke and gas conditions and building up ammonia gas concentration.

After the first two preliminary tests for periods of 5 and 15 minutes each, it was decided for the last test to make the conditions as severe as possible. When preparations had been completed, the demonstrator entered the smoke house with a lighted lantern, which went out in about half a minute. He then attempted to light matches, but that was impossible. While the fire was very hot, frequent additions of oily waste were made to keep it going. The sulphur candle placed on the floor burned throughout the test, adding to the very dense smoke. During the first test it was possible to tell time by placing a watch directly against the mask eyepiece and against the glass door, but during the last test it was not possible to



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Phoenix Highway Snow Plow *for Town and Country Roads*

BUILT FOR SERVICE

The Phoenix Highway Snow Plow has proved itself during the past three years to be the most successful and most economical plow manufactured. Built exclusively by one of the largest manufacturing firms in the Northwest. The Phoenix Highway Snow Plow has been successful under almost every winter condition.

Built of selected hardwoods, strongly re-enforced with heavy forgings and castings. The Phoenix will out-wear any snow plow on the market.

ADJUSTABLE WINGS—for wide streets or narrow roads the adjustable Phoenix will clear any space from six to twenty feet and with its special adjustable center plow work to any depths desired.

Write us today for additional details, price, etc.

Sales Agents Wanted.

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do this. In fact, the smoke was so thick that a finger placed on the mask eyepiece appeared to be only a blur and could not be distinctly seen, while the hand held two or more inches away from the mask eyepiece was entirely invisible. During the latter part of the test the ammonia fumes commenced to burn the skin slightly, but were not noticeable in breathing. At the end of 20 minutes the fire had commenced to smoulder and the demonstrator was trying to improve it when the test was called off, and he was asked to come out.

He was pronounced by the officials as being in good physical condition and reported absolutely no ill effects as a result of the test, stating that no noticeable gases or smoke had penetrated the mask and that in spite of the extremely dense smoke the filter canisters did not become clogged nor was his breathing interfered with.

Iron Fence for Back Yards and Alleys

There is much difference between the back yards and alleyways of our cities which have high board fences and those which have neat, open iron fences like that illustrated below. When there is a big board fence those on the inside cannot see the rubbish in the alley and those going through the alley cannot see the junk which is piled up against the fence in the back yard.

As a means of promoting public sentiment in favor of cleanliness and a 52-weeks' clean-up campaign each year, iron fences are particularly valuable. The photograph shows one of the many types of simple, ornamental iron

fences manufactured by Stewart Iron Works Co., Cincinnati, Ohio, which are used in many cities as an effective means of increasing civic pride.

New York Engineers and Chemists Move Office

Banks & Craig, Engineers and Chemists, formerly of 134 East 44th Street, have announced the removal of their New York office to 51 East 42d Street, New York City. The Harrisburg office of this company is 709 Telegraph Building, Harrisburg, Pa. The engineering work of Banks & Craig is of particular interest to those interested in municipal activities, as it includes the design, supervision, construction, operation and valuation of water-works systems and purification plants, sewage systems and sewage treatment works, garbage, refuse and industrial waste disposal plants, as well as the extensive field of public health and sanitation engineering, drainage, mosquito control and town planning. The firm is composed of Henry Ward Banks, 3rd, and Robert Hall Craig, C. E., with whom are associated D. D. Jackson, Sanitary Engineer, and G. J. Lyon, C. E., Consulting Hydraulic Engineer.

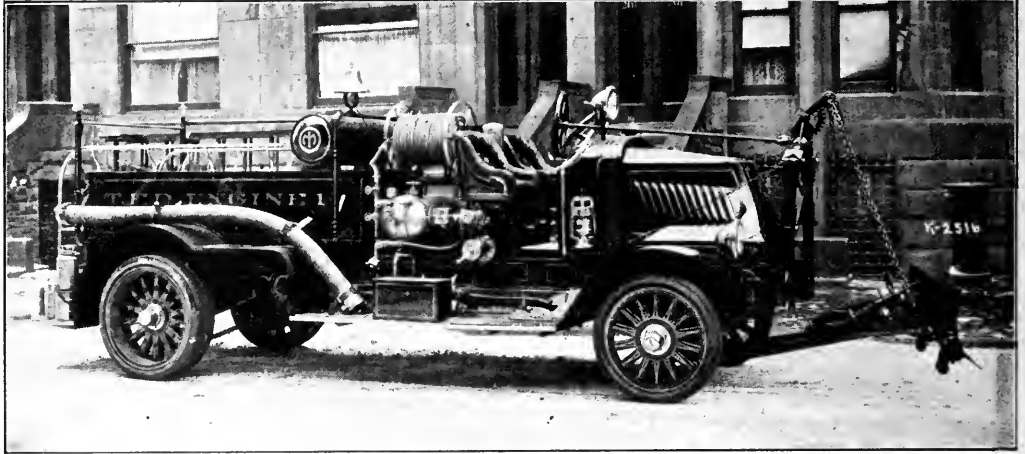
New Warrenite Highway

Bids were received by the New York State Highway Department for 3.62 miles of resurfacing with Warrenite-Bitolithic pavement Caledonia-Avon Highway No. 5273 in Livingston County, N. Y., originally constructed with Portland Cement concrete pavement.

The contract was awarded to the Standard Bitolithic Company.



THE IRON FENCE HELPS TO MAKE THESE BACK YARDS CLEAN, AIRY AND HEALTHY



The Snow Plow Attachment *For Mack Fire Apparatus*

THE International Motor Company has developed a most comprehensive line of special motorized equipment for municipalities.

The snow plow attachment for Mack fire apparatus, which is quickly demountable, offers an opportunity to obtain virtually two pieces of apparatus for little more than the cost of one. By the use of this plow a fire fighting machine is converted into a Fire Protection Unit as well. It opens up the streets so that alarms may be answered without delay.

Snow plowing is gruelling work but the Mack has repeatedly demonstrated its ability to meet the most adverse conditions.

Detailed specifications of this equipment will be sent to interested municipal officials. Address our Public Works Department, Room 2007.

INTERNATIONAL MOTOR COMPANY

25 Broadway

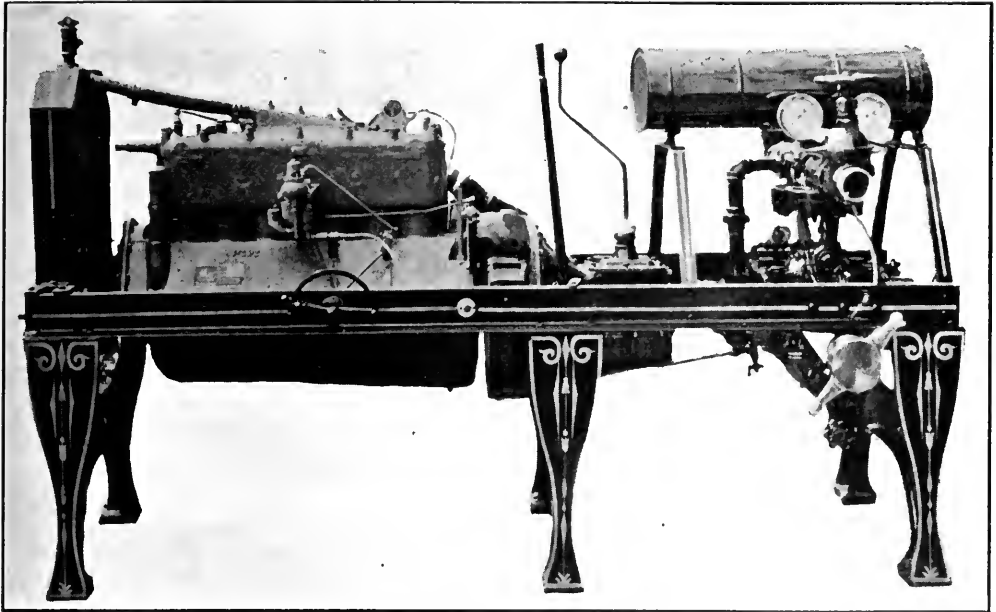
New York

Two Models—AB—AC—



Twenty-Eight Types

PERFORMANCE COUNTS



MOTOR FIRE APPARATUS MOUNTED ON STAND AT FIRE HOUSE

Novel Solution of Fire-Protection Problem

In Artesian, S. Dak., a rather peculiar water-works and fire-protection problem was solved in a novel manner. The water-supply of the city is secured from an artesian well which delivers water at about 10 to 15 pounds pressure at the surface. This pressure was formerly about 40 pounds. The water flows into a large reservoir, and from this reservoir a connection is made direct to the rotary pump made by the Northern Fire Apparatus Company, 2420 University Avenue, Minneapolis, Minn., which replaces the former pumping equipment in the fire house. Hand-drawn hose reels with hose attached to the pump at all times are located in the fire house. When the fire alarm is sounded, the firemen lay the hose as they run to the fire, and when they arrive are ready to throw a stream of water immediately. This solution has proved satisfactory in this small community.

Westinghouse Transfers Arc Lamp Factory to South Bend

The Westinghouse Electric & Manufacturing Company announces that the manufacture of arc lamps, arc lamp repair parts and copper Luxsolite fixtures has been transferred from the Newark Works to South Bend, Ind. Arrangements have been made so that service will be insured during the transfer of equipment to the South Bend works.

Artistic Drinking Fountain in High School

The accompanying illustration shows the type of sanitary drinking fountain recently installed

in the new high school in Fargo, N. Dak. The school cost \$500,000 and is considered one of the largest and most up-to-date school buildings in the state.

The chief essentials for the health and comfort of the pupils in the building were furnished by the Crane Company, Chicago, Ill., through its Fargo branch, the Crane & Ordway Company. W. B. Ittner, of St. Louis, Mo., was the architect of the building and the R. J. Cheney Company, Minneapolis, Minn., handled the general contract.



"CRETA" DRINKING FOUNTAIN



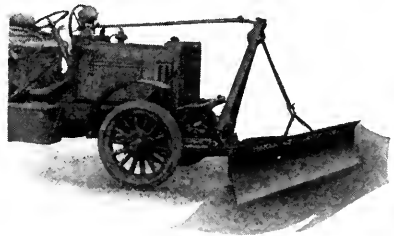
BAKER

AUTO TRUCK SNOW PLOWS

Attached to Standard Motor Trucks.

Cities, Road Officials, Parks, Cemeteries and large industries can make good use of their motor trucks by attaching the Baker Auto Truck Snow Plow.

We also make Snow Plows for leading makes of tractors.



Act on your snow plow requirements now. Have them ready before it snows. We offer you a time-tried plow backed by our long snow plow experience. Patent, hinged, spring-supported blades prevent injury to truck or plow when hitting crossings or man-holes. Special axle clamps permit attachment without drilling. Easily attached, easily operated.

Ask also about our Horse-Drawn Snow Plows.

THE BAKER MFG. CO.

503 Stanford Ave.,

Springfield, Ill.

MUSHROOM TRAFFIC LIGHT

MILWAUKEE TYPE

A Completely Illuminated Traffic Guide

The Milwaukee Mushroom Traffic Light is a cast steel unit that is all light. It is particularly valuable for narrow streets, street car intersections, heavy traffic streets and boulevards. This unit is 8 inches above the street surface and is prominent enough to be respected.

Our descriptive bulletin sent free on request.

Electrical & Specialty Supply Co.

MADISON TERMINAL BUILDING,

CHICAGO, ILL.



A Compressed-Air Fire Alarm Signaling System

In many communities there is need of a public fire alarm signal with a distinctive tone that can be heard a distance of several miles. The Gamewell Fire Alarm Telegraph Company, Newton Upper Falls, Mass., has designed a compressed-air signal for such conditions. The system consists of a Diaphone, a compressed-air reservoir for supplying the power to blow the Diaphone, a motor compressor to furnish the compressed air, a special electrically operated valve which operates the Diaphone when a street box is operated, and necessary gages, piping, etc.

The combination of distinctive tone—a tone which cannot be mistaken for any whistle—and the great carrying power, has made this equipment a favorite with a large number of American cities and towns. The Smith electric valve, a new invention in this system, does away with the need of a whistle-blowing machine and decreases the attention which the signal requires. A whistle-blowing machine can be used, however, if any city has one and desires to make use of it. In cities which have no fire alarm boxes, the Diaphone can be operated by use of a transmitter located in some convenient place. The town can be divided into sections and each section numbered. When the alarm of fire comes in, the disc representing the district is placed on the transmitter and the proper number sounded. Every city or town which has a public fire signal should have one that gives the location of the fire, not a signal which simply sounds a general alarm with consequent delay. Even though a town now has no fire alarm boxes, every piece of apparatus should be bought with the idea that eventually the town may have boxes. When this is done, the compressed-air signal will work as well with the boxes as it does without. The Diaphone has

the important advantage over the siren of sounding a clear, definite and distinct number signal. In addition, it is not dependent upon keeping up steam.

The Diaphone itself should be placed on or near the roof. It is not necessary that it be placed particularly high if care is used that the sound is not penned in by surrounding buildings. The Diaphone equipment is installed and housed so that it is protected from weather and from freezing. The housing is so arranged that ready access can be had to the various parts for care and inspection.

The compressed-air reservoir and the motor compressor should be located in the basement. Power for running the motor compressor can be supplied by the electric light company or other local source of power.

This compressed-air signal has three very important advantages over the old style compressed-air systems. First, it has a greater volume of sound and greater carrying capacity; second, the space occupied is much less, and one reservoir will do as efficient work as two or three reservoirs of the old style units; third, it has a distinctive tone which cannot be confused with the tone of any whistle or other device.

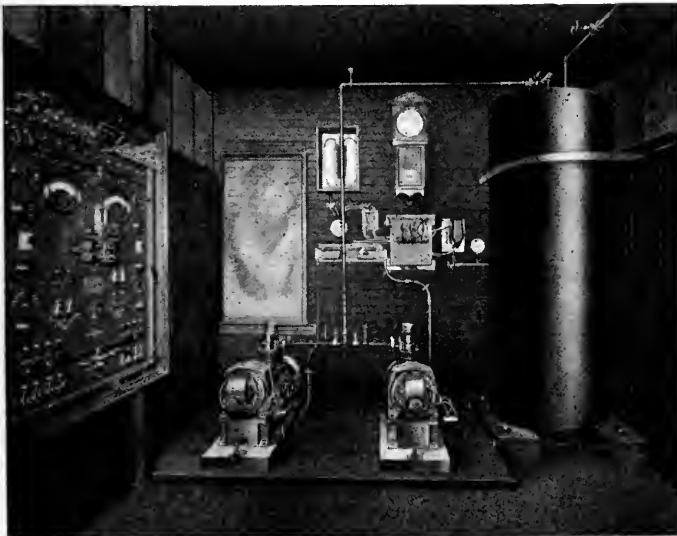
Buffalo Installs Payne Dean Control

Payne Dean, Ltd., 103 Park Avenue, New York City, reports receiving an order from the city of Buffalo covering the complete electrical operation, by aid of the Dean Control, of fifteen 48-inch diameter existing gate-valves in the Jersey Street section of the Massachusetts Avenue discharge main. These valves will all be controlled from one point, which will enable the shutting-down or change-over of the system to be made within 15 minutes, instead of a number of hours, which time is now necessary when a shut-down is required.

A similar installation of the city of Cambridge, Mass., covering four Dean Control units attached to large gate-valves for the protection of the city, has also recently been completed.

Smith Becomes Assistant Professor

Herschel C. Smith, formerly Deputy State Highway Engineer of Oklahoma, has been appointed Assistant Professor of Highway Engineering and Highway Transport at the University of Michigan, from which institution he graduated in 1913.



THE BUSINESS END OF A SIGNAL THAT CANNOT BE MISTAKEN



Last winter New York City was ready for every snow storm. Their fleet of fifty "Caterpillar"* Tractors, fitted with 10-ft. snow plows, broke through the deepest drifts, kept vital traffic running, and prevented big business losses. New York's foresight saved the city millions of dollars. Detroit, Minneapolis, Denver, Akron, and scores of other progressive cities and towns now are "Caterpillar"*-equipped. Besides insuring efficient snow removal, their "Caterpillars"* are profitably used for building roads, leveling park sites and hauling materials. Every public official and highway engineer should see our motion pictures of the "Caterpillar"* in action. Write today for further information.

**There is but one "Caterpillar"—Holt builds it*

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Lead-Lined Pipe and Valves

Pure water is of the greatest importance to any community, as disease lurks in every drop that is polluted. While pure water is assured in some cases by using sources free from pollution or possible pollution, the usual method of obtaining a pure supply of water is through some form of filtration, disinfection or both. There are many methods used in purifying water such as by sedimentation, aeration and filtration, but the most common, mechanical filtration, uses alum or aluminum sulphate. Its primary function is clarification, and secondly, alum removes some bacteria, for many of the latter cling to the suspended matter precipitated through its action.

Dry alum is mixed with water in solution tanks and for this purpose many places are



A CHEMICAL LEAD-LINED FLANGED PIPE AND FITTING

using chemical lead-lined tanks, such as are manufactured by the United Lead Company, 111 Broadway, New York City, as chemical lead is one of the best materials for withstanding the corrosive action of alum. These tanks are made of steel, according to blueprint or specification and lined with lead which by the "United" method is inseparably bonded to the steel. The alum solution should be conducted through chemical lead-lined pipe to orifice boxes equipped with devices for measuring the flow, and then pumped by centrifugal acid pumps into the water before it reaches the sedimentation basin.

For conveying the alum liquor, lead-lined flanged pipe and fittings possess a number of advantages and are a very economical installation. The pipe is lined with a heavy seamless chemical lead tube bonded to the steel casing. In flanged pipe the chemical lead lining is brought over and bonded to the recessed face of the flange, which gives a perfect lead contact throughout.

Another important link in water purification systems is the acid valves, as it is essential that perfect control be maintained over the solution at all times. This calls for valves which will be tight when closed, as well as acid-resisting. Lead-lined valves are particularly adapted for this work as they offer the acid-resisting qualities of lead and in addition have the strength of the all-iron valve. They are tight when closed, and by seating at the top when opened, pressure is taken from the stuffing box.

Hand Street Cleaners

While street cleaning is now done in considerable measure by motor street flushers and pick-up sweepers, as well as some vacuum cleaning outfits, there still remain many places where hand cleaning is continued because, through local conditions, it is more economical or more advisable.

The Rochester Can Company, Rochester, N. Y., manufactures the Menzies hand street cleaner, which is particularly useful in reducing the amount of actual labor necessary in cleaning streets by hand. The carrier frame shown in the illustration is built of Bessemer steel $1\frac{1}{2}$ by $\frac{1}{4}$ -inch with round corners, while the wheels are of the Sarvin type, 36 inches in diameter and equipped with double collar axle, making an easily propelled cart which is strong and durable. In addition to this carrying equipment, the street cleaner is provided with a dust pan as shown. This pan is rigidly attached by steel rods directly to the curved handle and is so arranged with an apron or flange that the dirt can be swept directly into the pan and then by simply an upward movement of the handle, deposited directly into the can. With this attachment, small brooms and shovels are unnecessary and the work can be accomplished in much less time.



THE MENZIES HAND STREET-CLEANING CAN CARRIER WITH CAN AND DUSTPAN

A Rubbish Burner for Parks and Playgrounds

Picnic parties and the casual wanderer almost invariably leave rubbish, old papers, trash and waste material in the parks of our cities, towns and villages. In order to keep the parks looking well, it is necessary to remove this material as quickly as possible. If it is gathered together and burned in the open, flying embers are liable to cause more or less damage and possibly start fires which will spread through the undergrowth or grass, destroying trees, valuable shrubbery and property.

The American Can Company, 120 Broad-



NOTE

Raised mixer platform permits dump wagons to receive loads direct from mixing plant.



Iroquois (two-unit) Asphalt Mixing Plant

Product of Forty Years' Experience

Iroquois Portable Asphalt Mixing Plants are the product of forty years' experience in asphalt street and road building. They represent the latest and highest development of asphalt mixing machinery.

Iroquois mixing plants are in operation wherever asphalt is used for paving streets and building roads. *They turn out more work at less operating cost than any other make.*

The fact that most of our orders for these mixing plants come from previous purchasers or on their recommendation proves their superior worth.

The two-unit plant shown above has the power plant on the same frame as the mixer. The three-unit plant has a separate power plant. The especial advantages of each type are described in our BULLETIN No. 2-B. Write for it at once.

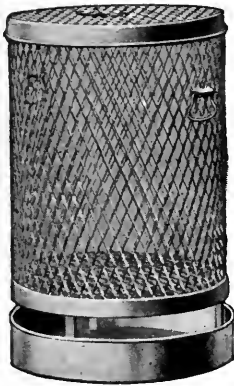


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San Francisco



**A SAFE AND SANE
RUBBISH BURNER**

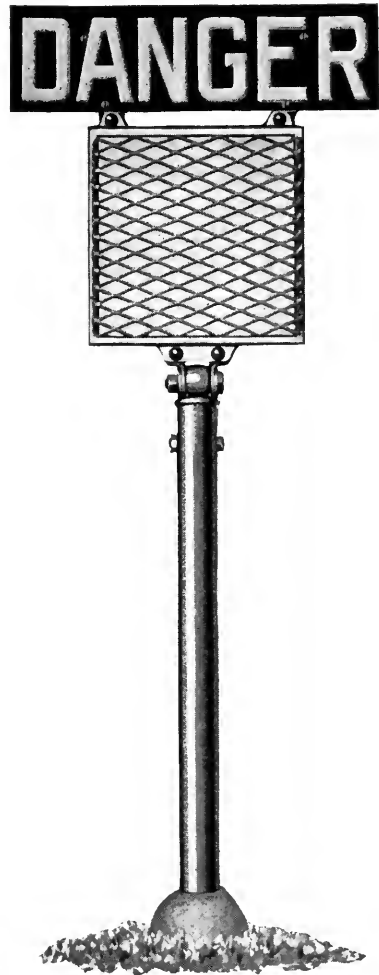
way, New York City, has placed on the market the Canco rubbish and trash burner, the body of which is made from one piece of No. 12-gage open hearth sheet steel, made so as to withstand the heat of materials being burned, without warping. All joints in this burner are welded so that there are no rivets to become loose and no soldering which will drop out of any part of the can. After the burner is made up, it is heavily galvanized. It is claimed that this burner is the only one on the market with a solid bottom and a detachable base or pan. The advantage of the detachable base is that ashes from the burner always drop into the pan and are not blown about. With ordinary burners the ashes are generally scattered about wherever the rubbish is burned, making an unsightly looking area. The size of the mesh and the cover make it possible to fill this burner completely with sweepings, papers and rubbish, touch a match to it and leave it with absolute assurance that there will be no flying embers or papers about to set fire to anything. These burners are made in two sizes—15 x 26 inches, weighing 24 pounds each, and 18 x 30 inches, weighing 35 pounds each.

Highway Danger Signals

Doing everything possible to prevent accidents is an obligation that rests on everybody. In building highways, it is impossible to eliminate all dangerous curves, crossings and other places where accidents are liable to occur. At these places a signal should be installed that will call attention to the danger and warn drivers to be careful.

The most effective danger signals have been red lights, as drivers have come to know the red light as a signal of danger. But lights of any kind require constant attention. They are liable to go out. Maintenance is expensive and the result never absolute.

The Redflex highway danger signal, manufactured by the Automatic Signal & Sign Co., Canton, Ohio, brings out a new idea in danger signals. It does not contain a light and therefore requires no attention. The light from an



AN AUTOMATIC HIGHWAY DANGER SIGNAL

approaching automobile strikes the special Redflex lens and gives it the appearance of an immense red light or ball of fire. When installed it becomes a permanent signal. It is in effect 36 lenses, each reflecting light at a different angle. The lens is 12 inches square, hermetically sealed in a cast aluminum case and protected by a galvanized screen. It is mounted on a galvanized steel post 2½ inches in diameter and 6 feet high.

Above the Redflex lens is the daylight danger sign. This consists of the word *Danger* in 5-inch aluminum letters on a black background. The sign is made of a heavy gage steel as near weatherproof as signs can be made. When installed the post is set in a concrete base which insures rigidity and permanence.



THE AMERICAN CITY

BEST

TRADE MARK

TRACKLAYER

REGISTERED

TRACTORS

**Prices
Reduced**

BEST "SIXTY"

effective at once

C.L. Best Tractor Co.

San Leandro..... Calif.

Maintaining Roads With a One-Man Outfit

Earth roads must be maintained at regular intervals throughout the spring, summer and fall seasons, to make them passable and serviceable to the community. The big problem to-day is that of securing labor and teams to do road work continuously. With this problem in mind, the Russell-Grader Manufacturing Company, Minneapolis, Minn., has produced a motor Hi-Way Patrol, by means of which considerably more work can be done by employing the same manual labor and eliminating animal power entirely. Reasonable estimates show that this motor outfit will do more than twice the amount of work done by the two-horse outfit. One man operates the grader and the tractor, having perfect control of both at all times. The outfit is light, so as to travel on soft ground, and yet is heavy enough to secure good traction.

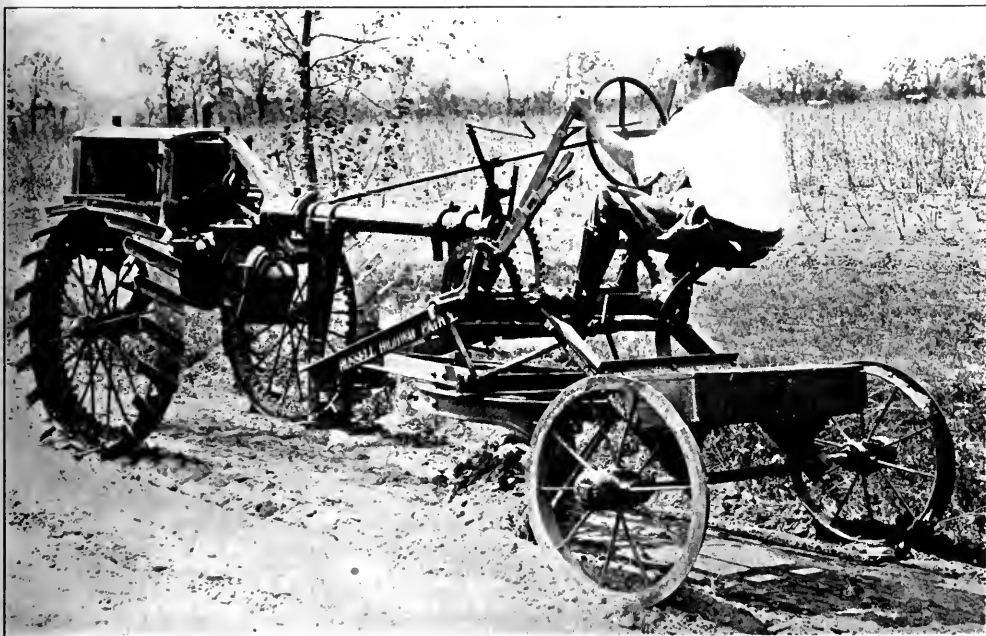
The tractor or power-plant of this machine is the product of the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., and the grader unit is a standard product of the Russell-Grader Company. The tractor is rated at 6 to 12 horse-power and has a maximum speed of $2\frac{1}{2}$ miles per hour. The power-plant consists of a four-cylinder, 16-horse-power engine bolted to the frame. It is equipped with a centrifugal belt governor which can be regulated to control the engine from a speed of 500 to 1,000 revolutions per minute, or to regulate the movement of the tractor from $1\frac{1}{2}$ to $2\frac{1}{2}$ miles per hour. The power from the engine is

transmitted through a Borg and Beck dry plate clutch, sliding gear transmission, roller pinion and bull gear final drive. The tractor has one speed forward and one reverse.

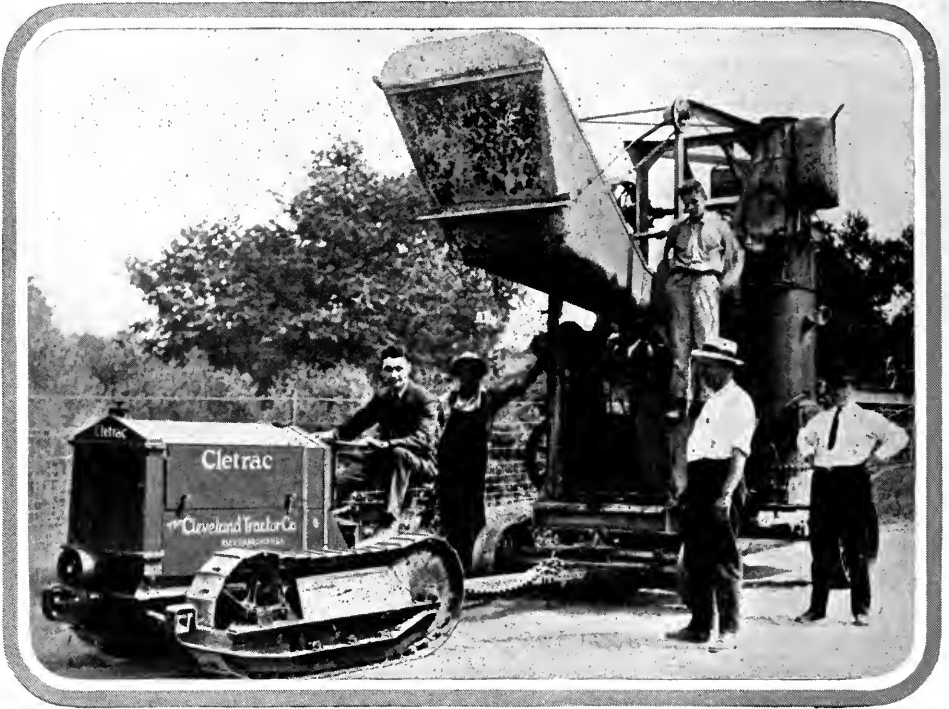
The grader unit consists of a blade 6 feet long equipped with a cutting edge which is removable. The blade is well supported and fastened to a circle which permits it to be completely reversed. The draw-bars are fastened to the circle and connect to a king-bolt, making an absolute direct draft from blade to power-plant, with no strain on the frame itself. The frame is an arched type, well braced. The heavy steel wheels are equipped with removable boxes and also hub caps which screw onto the hubs, acting as grease containers. The operator has a comfortable position on the grader, and all adjustments pertaining to both the power-plant and the grader are within easy reach.

The Horton Steel Works, Ltd.

The Chicago Bridge and Iron Works, Chicago, Ill., announces that its Canadian subsidiary, the Canadian Chicago Bridge and Iron Company, Ltd., of Bridgeburg, Ontario, and Montreal, Quebec, has changed its corporate name to Horton Steel Works, Ltd. This name has been selected in honor of the late Horace E. Horton, who founded the organization in the United States in 1865. The Canadian organization was first incorporated in 1913, and the plant in Bridgeburg, Ontario, was constructed in that year.



A COMPACT AND POWERFUL COMBINATION OF TRACTOR AND ROAD GRADER



A Handy "Man About Town"

PROGRESSIVE MUNICIPALITIES use Cletrac because of its *exceptional* versatility, economy and endurance. On a moment's notice it tackles almost any road, street or construction work and speeds it through. Cletrac does the work of at least three teams, in the space required for one. It doesn't have to be fed when idle, needs little care, and saves the wages of several drivers.

Weather doesn't bother Cletrac—it steps right along in snow or sunshine. Its two tank-type tracks keep it up out of the mud. And it digs in with its "toe nails" on hard or slippery surfaces.

There's never any miring or slipping. See the Cletrac dealer near you—or write direct to us—and learn how Cletrac will save you money on hosts of jobs in any season of the year.



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WAY. BUT—



EASY ON A TRACK:
THE CLETRAC WAY

THE CLEVELAND TRACTOR CO.

Largest Producers of Tank-Type Tractors in the World

19205 Euclid Ave.

Cleveland, Ohio



A MATTHEWS CABLE JOINT AS SEEN THROUGH THE
MANHOLE OPENING

Splicing Joints for Fire Alarm and Police Signal Cables

The problem of easy splicing of cables, in fire alarm telegraph systems and police signal systems particularly, led W. N. Matthews and Brother, Inc., St. Louis, Mo., to develop the Matthews cable splicing joint consisting of a closed lead sleeve and external brass collar, lead disc or gasket, and an internally threaded brass collar. By the use of this joint, the conductors in a cable splice are always accessible for changes or tests.

It is frequently necessary to open cable splices for the purpose of making tests, locating trouble, or changing the conductor assignments, because of changed plans of distribution. In order to open up an ordinary splice, it is necessary to remove the lead sleeve and afterwards replace it by the necessary wiped joints. With the Matthews joint it is only necessary to unscrew the sleeve, which exposes the cable conductors without in any way altering the wiped joint. Tests made on a splice joining two 25-pair cables and carrying also a 15-pair tap cable have shown that the time of changing the conductor assignments of the 15-pair tap cable was, with this joint, approximately one-fourth of that required in making in the regular way the joint containing similar cables. The time of tagging the conductors, which would be common to both splices, has been omitted in this comparison. To this saving in time in favor of the Matthews joint should be added the further saving due to the fact that less material is required to make the change than in the regular splice. With the patent splice, the material required would be the paraffine and gasoline necessary to boil out the splice. In the regular splice, there would be the solder, a greater amount of paraffine and gasoline, and perhaps a new lead sleeve.

Gravity Bubbler Fountains

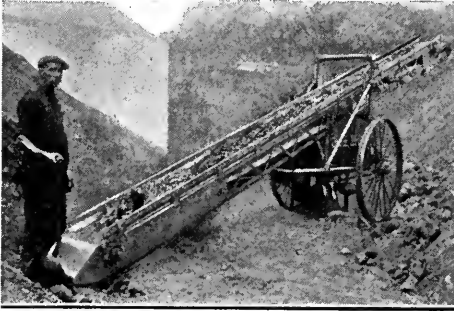
Very frequently in rural school-houses where there is no city water-supply, or in newly developed parks lacking this public utility, or where fêtes are held for the benefit of public institutions, it is both advisable and necessary to furnish sanitary drinking facilities.

The Rundle-Spence Manufacturing Company, Milwaukee, Wis., makes two types of gravity bubbling fountains, which are used in many places under the conditions mentioned above. The fountain illustrated has a galvanized iron insulated cooler with stoneware container. It is mounted on a japanned steel stand and has a galvanized water pail to catch the drain from the self-closing bubbling

gravity fountain. The sanitary fountain itself is made with a china cup which acts as a mouth guard and prevents the lips from touching the drinking head. This type of fountain is also made at slightly less cost, with an earthenware jar and cover replacing the galvanized steel insulated cooler.



A SANITARY BUBBLER FOR RURAL SCHOOLS



Every Department of Public Works can save money by using a Haiss Portable Belt Conveyor

The least expensive mechanical substitute for the shoveling gang—on road work, construction, etc.

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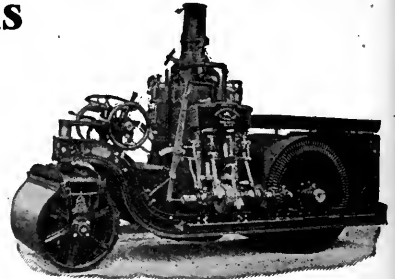
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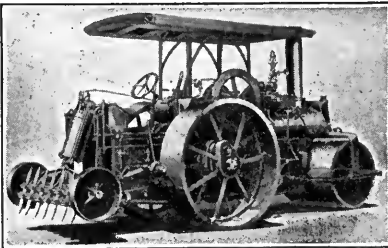
Write for illustrated material.

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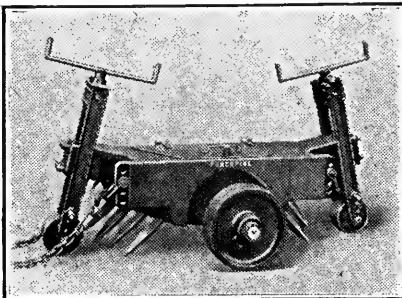
Are purchased by Discriminating buyers due to the many years of satisfactory service which they will render, the low repair costs and their general reliability.

**ALL SIZES—ALL TYPES
STEAM AND MOTOR ROLLERS**

Users of Buffalo Pitts and Kelly Springfield Rollers should equip rollers with Pressure Cylinder Scarifiers.

Full information as to cost furnished on request.

**THE BUFFALO-SPRINGFIELD ROLLER COMPANY
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For Road Maintenance

Use A "Reliance" Porcupine Scarifier for Best Results

It is Absolutely Essential That the Old Top Be Loosened up Before Applying New Top Dressing.

Our Scarifier is Designed for Just This Purpose—Will Save You Many Times Its Cost.

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KINGSTON, N. Y.**

Manufacturers of the Famous Reliance Road Building Equipment

VOLUME XXV

NUMBER 5

The American City

 NEW YORK
 NOVEMBER,
 1921

The Living Memorial—An Established Fact

By Martha Candler

IN Lowell, Mass., the next two months will see the completion and dedication of the country's greatest achievement toward commemorating the valor of our soldiers in the World War. The auditorium just being completed at a cost of a million and a quarter dollars is believed by the citizens of Lowell to be the most imposing public building ever erected in New England; certainly, it is the most conspicuous example thus far of the definite new type of public building which the American post-war democracy has evolved.

Across the entire front of the granite structure lies a Hall of Trophies which has been designed as a repository for records, equipment and paraphernalia such as grow increasingly interesting with the passing of years. Here the names of Lowell's 7,000 sons who went into the service will be inscribed and special honor paid those who fell on the battlefields. The cornice around the hall is hung with flags, the collection containing as nearly as possible the exact replica of every military and naval flag ever used in America.

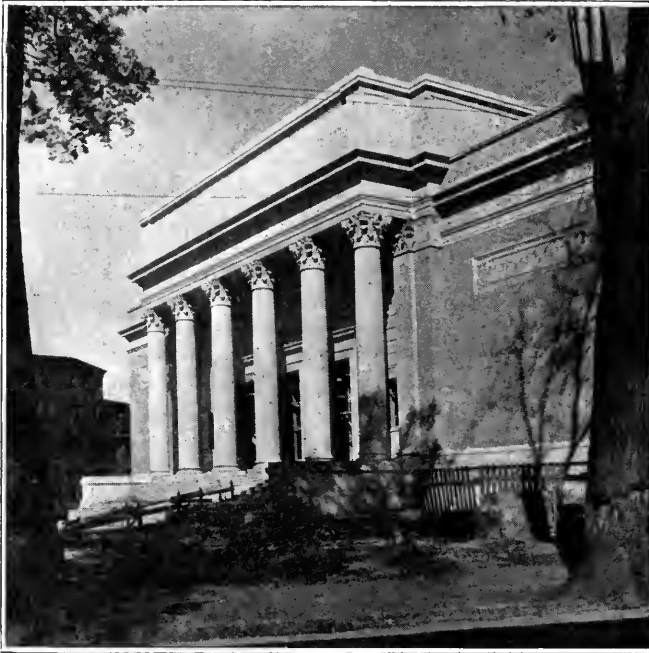
The Great Auditorium in Lowell

The visitor entering the building through the Hall of Trophies, which is the main entrance, passes into a vast auditorium, oval in shape and conforming in construction and equipment to the most modern ideas of architecture in public buildings. The parquet floor and the balcony are equipped to seat 4,000 people comfortably and with un-

obstructed view of the stage. Thus Lowell is afforded a free gathering place many times larger than the city ever had before. When not in use in this way, the seats on the level section of the parquet floor are removable, leaving the floor space available for dances, banquets, expositions and large-scale reunions.

The great stage is so constructed that its central section may be lowered by hydraulic plungers. Locked at floor level, it will permit the heaviest cars to be driven over it and onto the auditorium floor, which is admirably adapted for automobile shows and the like. Since it can also be lowered to basement level, the stage section solves the problem of removing the heavy seats from the auditorium with a minimum of time and effort. The stage itself is constructed to accommodate 400 people well within the proscenium arch and in full view of the entire auditorium, thus affording adequate space for commencement exercises, massed choruses, or great civic pageants. By special acoustical arrangements and separate lighting systems, the stage may be transformed into ordinary size for theatrical performances, or into still smaller size for a lecture platform. A movable console is to be installed for the organ, which will enable the organist to play the instrument from the orchestra pit, the stage, or from whatever section of the building is desired.

Flanking the auditorium and with a majestic entrance direct from the side street is Liberty Hall, large enough to accommodate



Courtesy of Blackall, Clapp and Whittemore, Architects, Boston, Mass.

THE COMMUNITY BUILDING OF LOWELL, MASS.

A noble expression of civic spirit, of which the city may well be proud

800 people for dances, socials, informal meetings or banquets. Opposite Liberty Hall and running the length of the building on the river side are the headquarters offices of all local patriotic societies—the G. A. R., the Red Cross, the Sons of Veterans and the Spanish-American veterans, and, above them, the American Legion quarters. Library and gymnasium facilities have been included in the building, also the most modern kitchen equipment, the latter so installed as to be easily available for serving large or small parties in any section of the building.

The façade of the building will, in time, bear in incised lettering the great names of America—from Lexington and Concord to the Argonne. In time, too, the beautiful winding drive along the river front will be decorated with sculptures particularly commemorating great war events.

Lowell was one of the 452 towns and cities which were reported by the Bureau of Memorial Buildings of War Camp Community Service some eighteen months ago as having considered the erection of some type of building in commemoration of local war heroes. Although many changes, modi-

fications and postponements have taken place since that official census was taken, present records indicate that as many as 650 have contemplated such buildings. Meanwhile memorial community houses, auditoriums, libraries and town halls are being completed and put into operation from one end of the country to the other. Since that day, before the signing of the armistice, when THE AMERICAN CITY put forth the idea of the "living memorial" as a worthy ideal of our democracy, great things have transpired. Not only is the "living memorial" a great ideal of the American people, it is an assured fact in the American consciousness. In time there will be a great National Memorial Building in Washington. In at least seven states there

will be central memorial buildings. Many states have already passed special laws through which the Memorial Building takes its place with the Town Hall, the Schoolhouse, and the Court House as a governmentally recognized institution.

In Lake City, Iowa

Typical of the spirit in which communities set about perpetuating their war record is the achievement of Lake City, Iowa, which, with a population of 2,300, has a new memorial building completed at a cost of \$85,000. The building, 62 by 120 feet in size, is of rough, vitrified brick with deep stone facings. The interior, especially planned as a center of social life for a large township in a prosperous farming section, as well as for the ex-service men, contains an auditorium with a seating capacity of 1,000, a stage, a moving-picture projecting machine, kitchen, dining-room, and reception rooms, a large gymnasium, shower-baths, lounges and lobbies.

Lake City had an enviable war record, going "over the top" in every campaign. In the Third Liberty Loan, Iowa ranked first in the Union, and Lake City headed the

list of Iowa towns in the returns, thus being the proud possessor of more stars than any other township in the country. But Armistice Day, 1920, was the greatest day Lake City had ever seen, for it marked the dedication of the new building to the boys who had come back and those who slept in Flanders fields and in the cemeteries of France. It marked the beginning of a celebration which lasted for four days, and to which people from all parts of the large county were invited, and came, and in which all took part.

In Greensboro, N. C.

In Greensboro, N. C., in an almost perfect example of the best type of Southern Colonial architecture, "the grateful community pays living tribute to all the men of Wayne County who fought and died for the cause of liberty." An outstanding need in the municipality and the county was for an adequate assembly and convention hall. Equally great was the need for a theater building which would attract first-class professional companies to that section and thus prove an asset to the social life. Both needs are realized in the auditorium, with its seating capacity of 1,500 and stage facilities adequate for any sort of performance.

The main entrance to the auditorium, like that in Lowell, is through an impressive memorial hall bearing the inscriptions of all service men from the county, and so lighted and decorated that none may pass through it without pausing a moment to dwell upon the nature of the building and its inspiration. The building is equipped with gymnasium, lockers and showers, bowling-alleys, a "rough-house" game room and a swimming pool which rivals any others in the South. Kitchen, library, rest and retiring-rooms for men and women insure the widest use of the building by the people of the entire county who come to town to shop and attend entertainments and social affairs. As headquarters for the Red Cross, Chamber of Com-

merce and other civic and social organizations, it serves the entire community daily, and it is particularly the home of the ex-soldier.

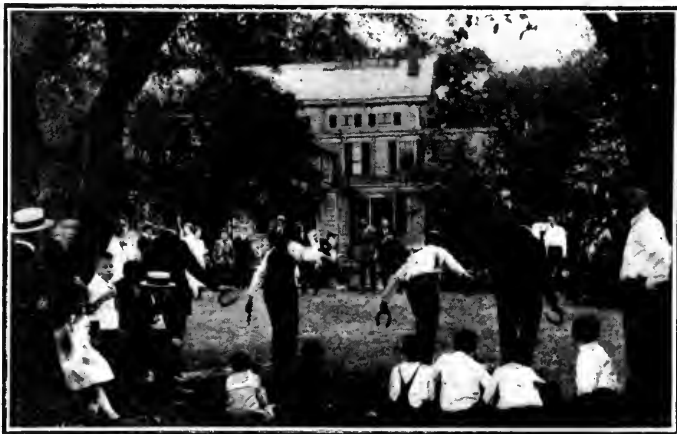
In Other Towns

The citizens of Rutland, Vt., have erected a memorial convention hall and armory at a cost of \$165,000. Tewkesbury, Mass., has a memorial town hall, as have a half-dozen other New England towns. Butler, Pa., Charleston, Wash., Manhattan, Kans., Old Lyme, Conn., Shannock, R. I., New Athens, R. I.,—it would be impossible to enumerate a fraction of the number of towns and cities in which community life is being stimulated and enriched by these community centers.

The State Assembly of Ohio in its last session unanimously passed a bill which, as soon as it can be passed by the Upper House, will insure to Cincinnati and Hamilton County what will perhaps be the largest local memorial in the country. As a memorial public library, it is to be erected in Cincinnati at an initial cost of \$3,500,000 "to perpetuate forever in books, in great sculptures and beautiful mural decorations the deeds of heroism, service and sacrifice of the war."

Enabling Legislation

There were already laws in nearly all states allowing municipalities and counties to erect through taxation town and county buildings for certain purposes. But as the memorial building movement has grown, the legality of imposing taxes for financing



Courtesy of Community Service, Inc.

**A REAL COMMUNITY HOME FOR THE CITIZENS OF
BLOOMFIELD, N. J.**

any part of the expenses of such buildings has repeatedly been questioned. Special legislation has been enacted in the cases of large undertakings such as that of Cincinnati and the state of South Carolina. Eleven states, however, have now passed laws, most of which are particularly favorable to the erection of community houses and social buildings in the smaller communities. Illinois, Iowa, Kansas, Massachusetts, Missouri, Michigan, Nebraska, New Jersey, Tennessee and Wisconsin have such laws.

A Remodeled Building in Bloomfield, N. J.

Nowhere is there a more successful example of this type of undertaking than in Bloomfield, N. J., where an old, historic family mansion set in the midst of spacious, shady lawns has been turned into a memorial community house. It is still a family mansion, with a common household of twelve sororities and fraternities, with the American Legion and five troops of Boy Scouts; with the Civic Association, the Town Improvement Association, the Board of Trade, and the women's clubs' headquarters. A local rifle club has a home in the basement, and a radio club meets regularly in one of the cottages belonging to the house. Opening day, all of Bloomfield came to celebrate. A bicycle parade and a baby parade brought the juvenile members of the families, who were turned over to the Community Service game leaders, while on a large wooden platform under a cluster

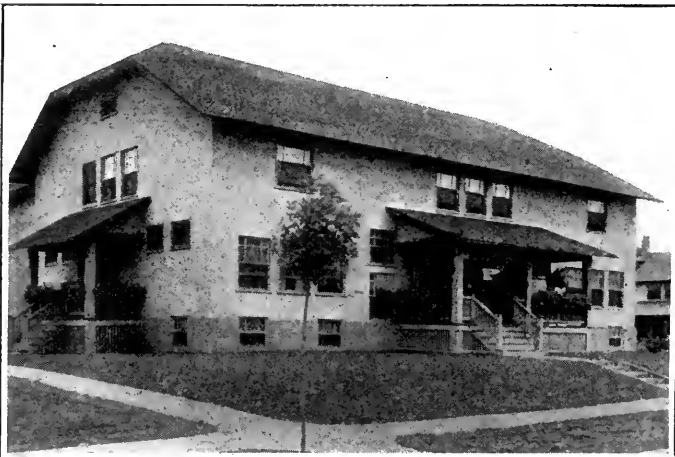
of trees the more formal program included a lovely poppy dance and a Pandora pantomime. On the croquet courts players waited their turn. Every see-saw was full. The volley-ball courts were busy. Tennis and medicine ball were in progress. Around the corner of the house in the shade of two great ancestral elms an interested knot of spectators hung on a game of quoits.

Bryn Mawr, Pa., has bought and remodeled a large stone building at a cost of \$130,000, and will use it for a community center which will bring college and town together. Ben Avon, Pa., also has a flourishing remodeled building. Unadilla, N. Y., has bought and remodeled property affording a large, light library, which the village lacked before, a community center and a large park and playground.

No mention of remodeled or adapted buildings would be complete without taking notice of the large number of armories in different sections of the country which have been given to the communities in which they exist to be reëquipped and operated as community centers. No record of the exact number of these buildings is obtainable on short notice, but in New Mexico and Texas alone eight of them are functioning as memorial community buildings. One of the most successful community programs in the country is being conducted through the one in Bay City, Mich.

Source of Information

The work of the Bureau of Memorial Buildings in sponsoring the erection of living memorials, of which THE AMERICAN CITY has published numerous accounts, ended some months ago. Its activities as an information department, however, have as nearly as possible been continued by Community Service (1 Madison Avenue, New York), which succeeded War Camp Community Service. Community Service is glad to answer inquiries of communities or committees interested in memorial building projects.



THE HOME OF THE GOOD FELLOWSHIP CLUB

The Community Building of Morgan Park, Duluth, Minn., built at a cost of \$15,000

The Sanitary Engineer—His Value in Health Administration

By Edward G. Sheibley

Consulting Civil Engineer, Los Angeles, Calif.

THE public should appreciate that the engineer is an indispensable factor in municipal life, particularly in health work, and that an engineering training is a preparation for effective work in public administration. Through ignorance, the public many times fails to realize the value to the community of men trained in special lines. When the qualifications of the sanitary engineer are fully understood, his services will be in greater demand.

The failure of engineers to receive greater recognition in public health work has been largely due to two causes: (1) the prejudice of the public on account of the confusing of methods with medical diagnosis, of technique with subject matter; and (2) the failure of the engineer to inform himself properly concerning matters that are not strictly of an engineering nature. As soon as engineers interest themselves in public affairs rather than merely in details of construction, and as soon as engineering schools require courses in such general subjects as literature, history and sociology, engineers will take a more prominent place in the general field of public welfare.

In our exceedingly complex life there is need for a strong force to bring together the heterogeneous elements. This force must have the confidence of the community. Since 1890 the authority of the sanitary engineer has been slowly developing. He has found service on public commissions as the representative of the philanthropic elements of the community. He is emerging as a leader in thought, a shaper of public opinion. His support has come from the community as a whole and not from any special interest. Service has been his ideal. Instead of striving solely for personal gain, he aims to make a given sum go farther and bring additional reward in health and happiness to the community.

Sanitary engineers in general are concerned with the construction of water and sewerage systems. Since water-supply and sewage disposal are more urgent than most

other municipal problems, engineers have centered their attention upon the construction details and have overlooked the opportunities for preventive work, which deals largely with environmental diseases. It is now generally acknowledged that the province of the sanitary engineer is not merely in the advocating and construction of great engineering works, but rather in the supervision of their construction and operation with a view to conserving public health and safety. His work is related to the protection of man from disease through the construction, operation and direction of those public utilities that may furnish routes of infection.

The popular conception of the science of public health is that it is a branch of medicine. This is an entirely wrong idea, for public health is not a medical monopoly. Engineering, as well as law, education, statistics and sociology, is an important factor. Engineers have always taken a large part in developing progress in hygiene and sanitation. It was sanitary engineering that made the Panama Canal possible, and not medical science, as is commonly supposed.

Public Health Administration

In public health administration the important thing is not whether a man has a medical degree or not, but whether or not he has a certificate or diploma in public health or is a graduate Doctor of Public Health. The ability of the man counts for most, and his training, whether along medical or engineering lines, is not the controlling factor. Many non-medical men and women are being developed into public health workers in twelve out of the fourteen schools that give instruction in public health. The number of non-medical workers is increasing rapidly. Realizing this fact, some opposition has arisen in the medical fraternity, as is apparent in a sentence from an address by Dr. Evans, former President of the American Medical Association. He said that "the future of the

[medical] profession depends on keeping matters so that when the public mind thinks of these things [public health problems] it automatically thinks of physicians and not of sociologists and sanitary engineers." It is important that this attitude be opposed. Mere graduation as a sanitary engineer does not fit a man to be a health officer, any more than the mere possession of a medical degree. It is, however, contended that the specially trained engineer who has a knowledge of pathology, epidemiology, entomology and other branches of science concerned with disease prevention has a big part to play in public health administration. Dr. Vaughan, Dean of the Medical School of Michigan State University, says that "the sanitary engineer, as an all-round man, is better fitted as an epidemiologist than the average physician."

The work of the health officer, in so far as it deals either with environment or with personal hygiene, from the public health standpoint is purely non-medical. The primary duty is not concerned with the diagnosis of individual physical ills, but with the treatment and prevention of the diseases of a composite public. The physician points out the conditions that menace the public health, and the health officer seeks for the best

means of preventing disease by rectifying conditions. It is perfectly possible to combat a typhoid epidemic without being able to tell the difference between typhoid fever and tuberculosis. The work of diagnosis is that of the physician; the engineer puts into effect the administrative and technical measures. The physician is qualified for the diagnosis and cure of disease, but in most instances is disqualified by training for preventive work. It has always been assumed that to prevent malaria or to alleviate its dangers one must be qualified to interpret pathological sections, but seldom is it desirable, even when possible, to have the same person act as both engineer and bacteriologist. There is neither time for, nor need of, the technic of chemistry, physics or biology. Trained workers may be employed in these lines. Nevertheless, the understanding of the meaning of these sciences and their relation to the result aimed at is essential. The right experience is probably that of an engineer who has had a varied training. There are indications that the extreme specialization has been reached and that the coming sanitary engineer will have a broader foundation as well as a sounder community spirit, which will benefit the community exceedingly.

Health Publicity

Attention to the subject of public health is being secured in a number of striking ways. The most conspicuous instance immediately before us is the Semi-Centennial of the American Public Health Association, whose Health Institute will be held November 8-11, in New York City. At that time will be presented the most successful methods of carrying on various phases of public health work in cities. The Health Exposition, November 14-19, will be conducted jointly by the Association and the Department of Health of the City of New York.

Rotary Clubs have been active in furthering the intelligent handling of publicity in aid of the people's health. The annual Rotary Convention three years ago adopted a resolution recommending a comprehensive campaign of education, looking to the enlightenment of the people of the United States on the various problems of venereal diseases. The next year the annual con-

vention adopted a resolution providing that the attention of Rotary Clubs throughout the world be called to the urgent need for progressive action in the promotion of physical fitness. Last year a convention resolution was adopted directing the designation of one week of each year to be observed by Rotary Clubs as "Public Health Week." The week of December 4 has been set aside in 1921 as Public Health Week for all Rotary Clubs.

Individual cities have realized their responsibility in this matter. Chicago's "Pageant of Progress," held July 13-August 14, featured prominently the city's advance in sanitation and health. Cincinnati's Health Exposition in October visualized effectively the way to health for the community. The Health Promotion Campaign, held in Montclair, N. J., early in the same month, was a fine piece of preparedness publicity in improving hygienic conditions.

Trees for City Planting

There Is No One Tree Best for City Streets—Local Conditions Must Be Considered

By Carl Bannwart

Superintendent, Shade Tree Division, Bureau of Parks and Public Property,
Newark, N. J.

THE Shade Tree Commission of Newark, N. J., created in March, 1904, became the Shade Tree Division of the Department of Parks and Public Property in September, 1911, and since that date has practically controlled the planting of all shade trees within the city limits. There is no provision in the ordinance limiting the planting of trees to one species on a street, but the matter of tree planting is in the hands of the Division, which advises generally the use of a single species in any one block or street. Usually a single species is selected for each street, and the trees of this species and of a single size are planted in equidistant rows on both sides of the street. It is believed that the result secured is far more effective than if the plantings were mixed. On one street Norway maples were planted on 20 blocks and then changed to pin oak when the territory was good for this tree. On another street oaks and Oriental planes were planted in alternation,

which is not an entirely displeasing combination but is not as effective as having several blocks of one variety and then several blocks of another variety if both are suitable for the streets.

What Is the Ideal Tree?

The ideal tree has not yet been produced. It would possess various desirable and Aladdin-like qualifications. In size it should be telescopic, adjusting itself automatically to the width of the street and the proximity of the houses. This Utopian tree would tolerate illuminating gas, would not encroach upon the sidewalk, would not make demands for a certain amount of unpaved area for the ingress of air and water. Its upper branches and trunk would take no harm from electric currents or from brutal pruning. Again, such a tree would repel borers which attack its trunk, or it would absorb them, as does the pitcher plant its visitors. It would be a hydra, each stalk



NORTH TWELFTH STREET, NEWARK, N. J., PLANTED WITH NORWAY MAPLES IN 1913 ON FILLED-IN LAND



THE SCARLET OAK, FORMERLY USED FOR STREET PLANTING, BUT NOW SUPERSEDED TO A LARGE EXTENT BY PIN OAK

capable of sending out two new leaves where the caterpillars and beetles had stripped it of one. In the spraying season it would exude an arsenate of lead of its own distillation. Furthermore, this ideal city street tree would send out its blossoms to signalize the reopening of its season, without scattering pollen in the air or petals and stamens on the walks, discharging these by a convenient chute of its own grafting into the ash carts which would arrive at preconcerted times. The same as to autumn leaves and fruit débris.

Sad to say, there is no such universal tree, so city foresters must make a selection from the real plant forms available. It is most essential that durable trees be selected for street planting. Much labor and, what is more important, much precious time, are lost when a mistake is made in this particular.

The Maples

The tree which combines more good qualities than any other is the Norway maple. It is of medium size and pleasing in shape.

Whether excess of coal smoke or of moisture or drought overtake it suddenly, the Norway leaf keeps its color and performs its work. The débris of its blossoms is a negligible quantity, that of the seeds unobjectionable, and extremes of heat and cold alike minister to its needs. It is the best of the maples for city streets—tough, substantial and long-lived.

The country cousin and first cousin of the Norway is the sugar maple, which is esteemed very highly in the country. It has a nobler crown and bearing and a nobler ancestry, and can be well planted in a place where there is plenty of room. Even the red maple is a good tree, somewhat larger than the Norway, but it is more brittle, loves more moisture, and is less adaptable to continued drought, scarcely making up by its ornamental colorings for other qualities which it lacks. It has some of the characteristics of the linden. It is suggested that if you want to take unnecessary chances, you plant a red maple.

Oaks and Lindens

Two varieties of oak are proving their right to hold a first place among city shade trees—pin oak and red oak (*Quercus palustris* and *rubrum*). These are both medium-sized, hardy, tough, and seldom bothered by insects, as the leaves are too tough for the pests. The pin oak is the more adaptable. It will thrive in moist soil and continue its patient growth in dry soil. The red oak is more particular; it wants only dry soil. The pin oak in good health keeps its leaves all winter. The leaves in its dry, brown, rustling crown are loath to leave their parent. Only when the sap stirs and the buds swell do the leaves drop. It is an excellent tree for use in sandy, well-drained soil. It prefers more moisture than the red oak.

One more tree of smaller size, and therefore more adaptable to narrow streets, is the European linden. It is a good tree, fine, showy, with fragrant blossoms and tender leaves, somewhat more rapid in growth than the maples and oaks above mentioned. It is hardy, likes moisture, but will fight it out even in dry soil, only it will be smaller.

The Elm and the Oriental Plane

There are only two more trees which may be cataloged as certainties for use in city planting. First, the American elm, which

is of loftiest crown, lightest shade, smallest leaf, associating New England with Old England. Of late it has been losing in favor as a shade tree in cities. Its pedigree is better and its character is as good as ever, but it has too many enemies. First, a wood-eater, the borer (wood leopard moth), an ugly customer, as one will kill a fine tree and it is difficult to control. Second, there are the leaf-eaters, the elm leaf beetle and the tussock moth caterpillar. These are easy to control, if you know how and when. Third, there is the sap-sucker, scale, which feeds on prepared sap; it does not do much harm, but looks bad. If you keep out borers, keep off beetles, caterpillars, lice, then the elm is a stately tree, graceful and delicate as ever. There is one more thing to consider, however: the elm must have a large area of open ground around it; in fact, it should be planted only in streets having a tree belt, a continuous open stretch between curb and walk, as it needs more air and water and must have a good draught to supply the topmost branches with sap.

The next tree, another giant, is the Oriental plane, also known as the buttonball, or the buttonwood, or the sycamore. It should be planted only on wide avenues. It is rapid in growth and symmetrical and is full of foliage when young and of a straggling, oak-like appearance when old. It seems to be the favorite tree in Paris, and the variety *acerifolia* the most dependable in London. The bark of the plane is shed in flakes and in the younger plant is white or green or brown, as the seasons vary. There is no experiment about planes, as they will grow even with slight moisture and are not troubled much by insects.

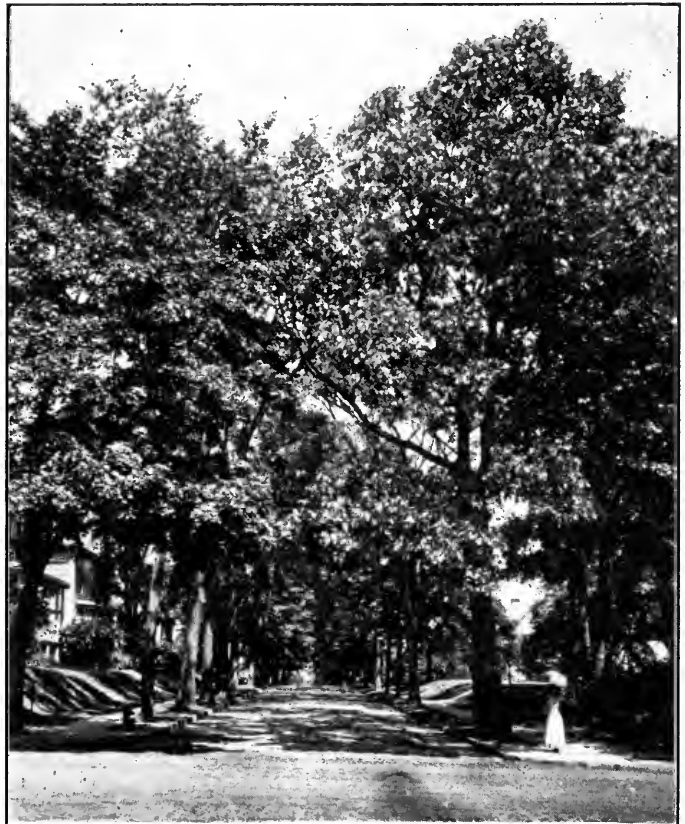
Less Hardy Trees

The Newark Shade Tree Division is ex-

perimenting with the tulip as a street tree. This is a beautiful native tree with showy blossoms and is sometimes called the tulip poplar, because its growth is almost as rapid as that of the Carolina poplar. This must be planted with a ball of earth when very young, one inch in diameter or thereabouts, and it is not troubled much by insects.

The horse-chestnut has many good points as a street tree, but is probably better adapted to lawns. The foliage is so dense that it ought not to be planted unless the house is considerably back from the street line. Unless supplied with much moisture, it will begin to shed its leaves in July. In blossom time it is a lovely sight with its wealth of white candelabra. The horse-chestnut belongs among the medium-sized trees. The early dropping of foliage is sometimes due to the fact that the tree sends out many leaves in the time of spring, when water is abundant, and lets these fall when dryer weather has become settled.

The ginkgo, the maidenhair tree, is a



AN OLD PLANTING ON NORTH FIFTH STREET, NEWARK, N. J.

Chinese immigrant. In its native land it has sacred associations. It is a hardy tree, immune from insects, rapid in growth, medium size, inclined to be scraggly in form, a tendency which can be checked by good pruning. The ginkgo is a pleasant novelty in leaf, habits, contour, characteristics, and ancestry. The ginkgo is a certainty, as it will grow, but should be planted only in proportion as dessert to dinner.

There are two more trees to be mentioned. One, the Carolina poplar, is the best tree for some situations. It is hardy, more a weed than a tree, brittle and short-lived, but it can do some things well. It should be planted under three certain conditions only. It will then improve upon acquaintance. If planted under other circumstances it will cause trouble. In Newark the staminate or male tree is planted, the planting of the pistillate being forbidden by law in some places, because of the nuisance of the seeds and pollen. The three favorable conditions for planting are as follows: (1) If you want a formal tree, to be maintained at a certain size by annual pruning; (2) if you

want immediate shade, the poplar is the tree, but set it out in alternation with Norways. Let the poplars provide the immediate shade, and in five years when the Norways have got well started on their century run, cut down the poplars. (3) Plant it where nothing else will grow—in factory districts in streets with filled-in soil. The poplar will stand more abuse than any other tree, but wherever the poplar is used, cast iron sewer pipes only must be installed. Poplar roots enter clay pipes through openings as small as the lead of a pencil and fill the pipes for 30 feet with roots.

There is one more undesirable among city trees. This is the silver maple, the black sheep of the maple family, as it is one of the most short-lived trees and is infested with borers. In Newark there is a ban on it because it is considered to be a waste of time and money. The following table compares the leading varieties of trees with regard to suitability for street planting and general conditions, including soil requirements and resistance to disease and insects:

TABLE COMPARING LEADING VARIETIES AS TO SUITABILITY FOR STREET PLANTING, SIZE, DENSITY OF SHADE, SOIL REQUIREMENTS, TOLERANCE OF SMOKE AND DUST AND RESISTANCE TO DISEASES AND INSECTS

NAME OF TREE	Density of Shade	Soil Requirements	Smoke	Resistance to Disease	Resistance to Insects
<i>Class 1—Widest Adaptability</i>					
Norway Maple (small).....	Dense	Dry or Moist	Tolerant	Good	Good
American Elm (large).....	Light	Moist	Tolerant	Poor	Poor
Oriental Plane (large).....	Dense	Dry or Moist	Tolerant	Good	Weak
Pin Oak (medium).....	Medium	Moist	Tolerant	Good	Good
Red Oak (medium).....	Medium	Dry	Tolerant	Good	Good
European Linden (small).....	Dense	Moist	Tolerant	Good	Good
<i>Class 2—Good—Under Specified Conditions</i>					
Horse Chestnut (small).....	Dense	Moist	Intolerant	Weak	Poor
Tulip (large).....	Medium	Moist	Intolerant	Good	Weak
Red Maple (medium).....	Medium	Moist	Intolerant	Good	Good
Ginkgo (small).....	Light	Dry or Moist	Intolerant	Good	Good
Carolina Poplar (small).....	Dense	Moist	Tolerant	Good	Weak
Ailanthus (small)— Pistillate Variety	Light	Dry or Moist	Tolerant	Good	Good
<i>Class 3—Experimental</i>					
Sugar Maple (medium).....	Dense	Moist	Intolerant	Weak	Weak
Mulberry (small).....	Dense	Dry or Moist	Intolerant	Good	Good
Liquidambar (small).....	Medium	Moist	.....	Good	Good
Hornbeam (medium).....	Dense	Dry or Moist	.....	Good	Good
Locust (medium).....	Medium	Dry or Moist	Tolerant	Good	Good
Pyramidal Oak	Light	.....	.....	.....	.....
<i>Class 4—Tabooed (Infested with Borers)</i>					
Silver Maple	Medium	Moist	Tolerant	Weak	Poor

The Use of Gasoline Engines in Water-Works Construction

The St. Paul Water-Works Saves a Considerable Sum Daily in Labor Alone

By J. W. Kelsey

Superintendent, St. Paul Water Department, St. Paul, Minn.

THE value of small gasoline engines to a municipal water department in operating air compressors, trench backfillers, concrete mixers and pumps is interestingly shown in the St. Paul Water Department, where five Novo engines are used for various purposes. One 15-horse-power engine is operating an air compressor, another 15-horse-power engine operates a trench backfiller, and a third of the same size runs a concrete mixer. The other engines are 2-horse-power, used on pump rigs to unwater trenches when mains are being laid. The two small engines have been in service seven years, and it was on the basis of their performance that the three larger outfits, which have been in use from one to two years, were purchased.

The air compressor is used on jobs where it is necessary to lay water-mains and pipes through rock. In many parts of St. Paul the rock lies very close to the surface and it is necessary to dig trenches through solid rock, some of which is limestone and some sandstone. In such cases, however, it is necessary to resort to blasting, and to drill the holes for the charges the 15-horse-power Novo engine operating the air compressor was purchased. This equipment produces 80 cubic feet of air at 100 pounds pressure per minute. Working at full capacity, the unit will operate a standard rock drill very easily, making it possible to drill in the hardest lime rock at an average rate of about 1 foot per minute.

Formerly this work was done by hand, but with the air compressor and jack-hammer and 2 men operating the rig, 18 men who formerly did the work by hand were replaced. Such labor received \$4 to \$5 per



OPERATING A JACK-HAMMER IN OPENING UP A WATER-WORKS TRENCH IN ROCK

day. The average is \$4.50, making a saving with the compressor of about \$72 per day in labor alone. The engine and compressor are mounted on wheels, making it easy to transport them to any part of the city. This is essential, as the Department finds it necessary to operate in different districts. An electrically driven compressor would be out of the question because it would often be impossible to plug in on electric current. A steam compressor would not be practical, because its excessive weight would make it too hard to carry around.

A goodly portion of the pipe-laying work in rock is carried on in the winter time, because it is just as difficult to cut through rocks in summer as it is in winter. The

Novo engine is absolutely frost-proof, but the compressor, being water-cooled, requires special care in cold weather.

The trench backfiller, which is used to fill in the trench after the pipes are laid, is operated by the 15-horse-power gasoline engine equipped with double drum, drag line and scraper. The capacity of the scraper is about 1 yard. In this work the Novo outfit is set up on one side of the trench and the scraper on the other.

The backfiller is a one-man machine and is very flexible in operation, as it is mounted on a caterpillar tread. It is capable of doing the work of about 3 teams with drivers, and 3 additional men are necessary to hold the scraper when horses are used. The outfit is capable of backfilling a trench 8 feet deep and an average of 3 feet wide at a rate of about 110 feet per hour. This makes its capacity about 2,640 cubic feet per hour.

When horses were used, the backfilling was very tedious work, and in hot weather both drivers and horses suffered considerably. The gasoline engine makes this work easier for everybody, besides saving considerable in wages and the hiring of teams. By the use of the equipment 3 men and 3 2-horse teams and drivers have been re-

placed.

These machines do not work every day, but the compressor averages about seven full months a year, and the backfiller about six full months. The cost of repairs on either outfit does not average over \$50 a year. The average life of either machine should be at least four years, and at the end of that period the backfiller can be traded in for a new one.

Figuring wages at \$4.50 a day for the operator and \$4.50 for the helper, the cost of operating the Novo compressor is \$15.29 a day, including \$9 a day for the wages of the 2 men required. As the 2 men with the compressor outfit do the work of 9 times as many men working by hand, it effects a saving of \$65 daily on this kind of work.

The cost of operating the trench backfiller is \$14.85 per day, including the wages of the one man required to operate it. As this outfit is replacing 6 men and 3 teams, it is easily saving the department \$30 a day over the use of teams, and as it handles 2,640 cubic feet per hour, the operating cost is .07 cents per cubic foot.

The two tables shown herewith give the detailed cost of operation of the air compressor and the trench backfilling machine.

Report No. S. 502	Date June 30, 1921
Owner, St. Paul Water Dept.	Address, St. Paul, Minn.
Operation, Operating Air Compressor	
Analysis of Units handled daily.....	Hours operated, 1200
Period covered, 1 yr. to 6-1-21	Days operated, 180
Investment and Depreciation	Period Cost
Cost of outfit.....	\$2330.00
Cost of additional equipment.....	\$ 50.00
Total depreciation yearly.....	\$2380.00
Estimated life, 4 years	Estimated for period, 180 days
Fixed Expense	
Average interest Total.....	\$ 87.37
Maintenance & Repairs.....	\$ 50.00
Balance of outfit.....	\$ 0.00
Insurance.....	\$ 0.00
Licenses or Bond.....	\$ 0.00
Taxes.....	\$ 0.00
Storage.....	\$ 0.00
Total yearly.....	\$187.37
Variable Expense	
Fuel cost.....1312.5.....Gals. at 27¢ per Gal. \$354.38	
Lubricating oil.....44.....Gals. at 50¢ per Gal. \$22.00	
Total period.....	\$376.38
Labor Cost	
Operator.....175.....Days \$4.50 per Day \$787.50	
Helper.....175.....Days \$4.50 per Day \$787.50	
Total period.....	\$1575.00
Total cost for period.....	\$2051.38
Total cost per day.....	\$11.40
Total cost for.....	\$11.40

(*Including rock drills, drill bits, hose, etc.)

Report No. S. 503	Date June 30, 1921
Owner, St. Paul Water Dept.	Address, St. Paul, Minn.
Operation, Trench backfilling	
Analysis of Units handled daily.....	Hours operated, 1200
Period covered, 1 yr. to 6-1-21	Days operated, 180
Investment and Depreciation	Period Cost
Cost of outfit.....	\$3000.00
Cost of additional equipment.....	\$ 0.00
Total depreciation yearly.....	\$3000.00
Estimated life, 4 years	Estimated for period, 180 days
Fixed Expense	
Average interest Total.....	\$72.00
Maintenance & Repairs.....	\$50.00
Balance of outfit.....	\$ 0.00
Insurance.....	\$ 0.00
Licenses or Bond.....	\$ 0.00
Taxes.....	\$ 0.00
Storage.....	\$ 0.00
Total yearly.....	\$122.00
Variable Expense	
Fuel cost.....1800.....Gals. at 27¢ per Gal. \$486.00	
Lubricating oil.....35.....Gals. at 50¢ per Gal. \$17.50	
Total period.....	\$503.50
Labor Cost	
Operator.....180.....Days \$8.00 per Day \$1440.00	
Helper.....180.....Days \$8.00 per Day \$1440.00	
Total period.....	\$2880.00
Total cost for period.....	\$3383.50
Total cost per day.....	\$18.80
Total cost per cu. ft.	\$0.007

The Railway Station

The gateway of the walled city has its modern counterpart in the railway station. The dignity of the city entrance can be maintained as easily in these huge twentieth century agglomerations of people as in the congested ancient cities with their protective walls.

The city approach is not limited to the railway station. It may be by water, or over water or land. If all the city entrances are correlated with each other and with the local transportation system, the maximum of service is secured with the maximum of dignity.

—CHARLES ZUEBLIN in "Municipal Progress"

The Topographic Map in City Planning

Part II

By Jefferson C. Grinnalds

Assistant Engineer, Topographical Survey Commission, City Plan Committee of
Baltimore, Md.

SUPPOSE a new city is to be built on a proposed site. The topographic map is made. It is possible to determine at once certain rocky, precipitous cliffs, bluffs, wooded ravines, steep hillsides and other suitable areas for future parks. These may be eliminated from the flat or gently rolling terrain so well adapted to building and over which a street plan must be studied. The old country roads shown on the map are the existing highways of travel. Some may fit in with a general scheme and others will not. A study will reveal the natural location of the points of ingress and egress for railroads. They will not come into town over the hills. They will enter by certain low grade lines and along them will be suitable territory for industrial development. On the higher ground will be the housing area. It is necessary to determine where the central business area should be. These various districts must now be connected. Radials from the center of town to the outlying sections must be provided. Cross-town and circumferentials must be provided. These streets are the basis for a major street plan. They need not be absolutely straight. The alignment may be determined by the contour of the ground, thereby giving easy grades but with the most direct route consistent with reasonable grades.

An old city that requires a plan for undeveloped or recently annexed territory and that needs replanning in built-up portions requires a topographic map. In almost every city of that type the street plan was drawn on a flat diagrammatic map. With the general information shown on a complete topographic survey, it is well to work out proposed extensions of the park system, reaching out into the undeveloped country, embracing the ravines, etc., and certain other land suitable for parks. These may then be connected by proposed parkways. These areas being determined, it is unnecessary to lay them off into streets. The city plan is simplified to that extent. The major

street plan may be laid down on broad lines. Existing grades may be corrected. Slight alterations may serve to give good results. Certain sharp curves may be eased up by curves of longer radii, and offsets may be cured by cutting off some corners. The buildings being shown, studies of the cost of widening may be made, and where it is necessary to accommodate the present or future traffic, a new building line may be determined and fixed. The map gives a good idea of the kind of improvements situated within the new lines. In the old parts of town the elevations may show a major street to be necessary on a high grade, and not far distant a low grade artery may be indispensable. Provision can be made for connections between the two. In outlying territory similar conditions may prevail. In the absence of a contour map, this could not be seen without a close inspection of the ground, and even then the exact locations could not be made unless a survey were available.

Old Systems Inefficient

The old checkerboard street systems are not practicable, efficient or economic over rolling country. Once upon a time that was the only practice. Closer study with broader information at hand and more intensive efforts at scientific planning have tended to make a street plan more nearly fit the natural ground. Some cuts and fills can not be avoided, but they can be reduced in number and in magnitude by a more rational layout, which is not only less costly by being more readily adaptable to the surface, but after all is more beautiful. The monotony of the long, uninteresting city streets so common in all cities will give way to the gently curving and sometimes winding parklike road. A contour map is the best possible guide for the city planner. It is likewise a guide to those who would develop land for sale as lots. They can see from such a map how best to make a street layout involving the least expenditure

for grading and which will give the best street connections. New streets can be made coterminous with those already existing, or a good reason for not doing so will usually appear on the map showing contiguous property. Much money can be saved to the city and to the landowners by the use of a good survey, and its costs will be returned many times. Indeed, grading cost alone on one or two of the existing main highways of some of the large cities has cost more than a topographic map would cost; and had it been available, the alignment might have been different, avoiding part of the outlay for grading.

Outside of what we might call the congested part of town and farther toward the outskirts, major streets may be laid out almost a half-mile apart and crossings of railroads and deep gullies may be situated at about half-mile intervals. These railroad crossings can be readily determined by studies of the topography. It may be found that where the road is a cut or fill, there is the logical place to cross instead of at grade "any old place" as they used to do. The writer emphasizes the grade-crossing menace and its abolishment by proper study, because it is so prevalent in all towns.

The Laying of Sewers

No other feature of city building depends more on the topography than the sewers. The twenty million dollars expended on a comprehensive sewerage system for Baltimore was based entirely on the map of 1894. On it the natural drainage could be traced and the storm water sewers followed it. The drainage area could be readily computed and the size of mains determined. Sanitary sewers were designed, too, from study of the surface as surveyed and by reasonable deductions as to the use to be

made of certain kinds of land. Grades, too, were an important factor. Water-mains are more easily located by having a map showing all physical features so the pipes may conform to the hydraulic gradient, and the areas they are to serve will have their bearing on the size.

The Value of a Topographic Map in Zoning

For purposes of zoning it seems necessary to have a map of all present conditions. First, to make an existing use map, the buildings should be shown. It will appear on inspection that they are of frame, brick, stone or steel construction. One can see that they are attached, that is, without side yards, that they are semi-detached, or that

they have yards on both sides. It will show those that are built up to the front line and those that set back. It will be easy to give each house and each piece of land a color to denote use, height, area of lot covered, assessed valuation of the land or improvements, or whether occupied by one, two or more families.

The map will show parks and cemeteries where people do not dwell, will show the low lands along the water and railroads

suitable for industry and the higher land adapted to housing. It will enable the engineer to select major traffic streets which will probably become retail business streets or heavy commercial haulage ways. Parkways and boulevards for the highest class residential district may be determined.

For thorough study of a proposed rapid transit system, a topographic map is essential. Elevations of streets, railroads and streams will give a clear conception of what levels the underground system will have to meet. If an elevated structure is necessary, the same data are available; and where the way may be in open cut on the surface, or on fill, safe and properly located crossings

The Varied Advantages of a Topographic Map

A contour map is the best possible guide for the city planner. It is likewise a guide to those who would develop land for sale as lots. They can see from such a map how best to make a street layout involving the least expenditure for grading and which will give the best street connections. New streets can be made coterminous with those already existing, or a good reason for not doing so will usually appear on the map showing contiguous property. Much money can be saved to the city and to the landowners by the use of a good survey, and its cost will be returned many times.

will be situated at suitable intervals.

In 1894 the Topographical Survey Commission of Baltimore began the preparation of a topographic map of that city on a scale of 200 feet to the inch, with contours at five-foot intervals. The map covered thirty square miles, the city's area at that time. The old part of the city prior to the annex of 1888 had been planned in 1819 without reference to topography. On the new map a plan was drawn and adopted for the development of the territory annexed in 1888. The city is now following that plan. In 1914 another map showing all the buildings in the city was made, with the surveyed street plan as the framework. In 1918 an additional sixty square miles of territory was annexed. Now the topographic map of 1894 is being extended to embrace the new addition and should be complete by 1922. These maps will give ample information on which to extend the street plan, design sewer extensions and water-mains and to

draw a zone plan, which ought to be the very best obtainable, since it will be based on a mass of data not usually available for zoning studies.

First-Class Maps Are Economical

Does the cost of making such a map pay? Well, if Baltimore's sewerage system cost \$20,000,000, it is conservative to estimate that one per cent of that amount, or \$200,000, would have been spent for surveys had not the map of 1894 been made. The map was paid for, then, by saving on one project. Thousands of dollars have been saved to property owners and taxpayers by reason of having a map available for the use of surveyors and engineers. By planning streets with reference to the contour of the ground the expenditure has been paid for many times over. City planning pays and the use of the term "city planning" ought to include the topographic map as the first step toward a comprehensive plan.

Resurfacing a Heavy-Traffic Boulevard

Avenue Originally Paved with Water-Bound Macadam Resurfaced After Fourteen Years with Bituminous Material and Crushed Limestone

By Fred Gabelman

Engineer, Board of Park Commissioners, Kansas City, Mo.

THE original water-bound macadam pavement on Linwood Avenue, Kansas City, Mo., was laid in 1900 and in 1901, 13 inches in depth. This boulevard is one of the most heavily travelled thoroughfares in Kansas City. After carrying the traffic for about 14 years, the original water-bound macadam was found to be beyond repair, and in 1914 it was decided to resurface the old pavement with a 2-inch bituminous macadam course.

The old macadam surface was first swept thoroughly to remove all dirt and loose material, and the surface adjacent to the gutters was excavated to a sufficient depth and width to allow for the laying of a uniform wearing surface. Following this, a sufficient amount of clean crushed limestone ranging in size from 1 to 2½ inches was spread so that after rolling and compacting it would be 2 inches in depth. This surface then received an application of Texaco asphaltic cement, using about 1½ gallons per square yard.

The application was made by hand with a can having a fan-shaped lip. By cross-application the asphalt was spread evenly and uniformly and the quantity regulated satisfactorily. The material was heated to between 325 and 350 degrees Fahrenheit and was applied only when the stone was thoroughly dry.

Immediately after the first application of asphaltic cement, a layer of clean, dry limestone, ranging in size from ¼- to ¾-inches, was spread in sufficient quantity to thoroughly fill all the voids. Then it was rolled with a 7-ton roller until it was compact and solid. As soon as possible after rolling, the second application of Texaco asphaltic cement was made, at the rate of 1/3- to ½-gallon per square yard. Then a thin dressing of clean limestone grit was spread over the surface and thoroughly rolled. The resurfacing has given splendid results with little maintenance. A view of Linwood Avenue is shown on the front cover of this issue.

Golf in Public Parks

By John W. Duncan

Superintendent of Parks, Spokane, Wash.

THE use of parks for play or recreation purposes has increased so much during the past two decades that the term "playground" should be used in the broadest sense of the word. The more people can be induced to use the parks for play purposes, the more we are doing for the benefit of mankind. It is admitted that our larger parks have not been and are not now used nearly to the full extent of their capacity for the enjoyment and recreation of the people. Every effort, therefore, should be made to have these larger parks used not only for the benefit of the few of esthetic taste, but also for the recreation of the masses. While avoiding the introduction of anything that will mar the natural beauty and picturesqueness of our parks, whenever it can be done, park departments should encourage all sorts of games for public recreation.

In discussing golf in public parks, the following remarks are presented from the view-point of one who believes that the object of a municipal course is to serve the greatest possible number of players, not with the intent of making a few golf experts, but with the purpose of getting as many people as possible into the open air through the medium of golf.

More Golf for More People

For the past thirty years, golf has been more or less played in this country, and apparently the first municipal golf course was established in Boston about 1891. Since that time other park departments have followed suit; but to-day, instead of every city of any size having a course in its parks, there are only about sixty municipal golf courses in the whole country. Three years ago, in response to a questionnaire, it was learned that of 75 cities having a population of over 25,000, only about one-half maintained municipal links.

Forty cities of over 25,000 population reported having established courses in their parks, yet, all told, the actual acreage reported by these cities was only a little over 4,000 acres. The figures averaged 102 acres

to a city. Twenty acres was the smallest course reported, and 170 acres the largest; in this latter instance, probably the whole park acreage was given instead of only the acreage of fairways and greens. Of forty cities reporting golf courses, seven reported having two courses, two having three courses and two having four. There were thirty having eighteen-hole courses, twenty-eight nine-hole courses, and two six-hole courses. Considering the total number of holes and the total acreage, the average per hole was about four and one-half acres. The longest course reported was 6,900 yards, and the shortest, 1,645.

The cost of maintenance does not seem to have been kept very closely, and as both wages and material have advanced so sharply in the last few years it is difficult to arrive at any definite figure for upkeep. Last year the total upkeep for the Spokane course, which is a nine-hole course and covers approximately fifty acres, was \$7,103.38.

The construction cost varies a great deal. The Spokane course cost about \$9,448 when it was first constructed some five years ago, and every season some improvements have been made, until the total figure for construction is \$11,600. This is for grounds alone, as the course does not have a regular golf house.

It was difficult to compare or determine either the maintenance or construction costs in other cities, however, as in some instances the ground had already been in grass and scarcely needed any grading, while in other cases grading and ploughing from the natural rough had to be done, and in some instances, water pipe laid all over the course. Other courses had laid no water pipe at all. As for maintenance, some cities charge up to maintenance only the work of attending to the game of golf, and charge the mowing, etc., up to general park maintenance.

The majority of municipal courses are free to the general public, though a few make charges. The charges run from one to ten dollars per season, from ten to fifty



THE NINE-HOLE PUBLIC LINKS OF SPOKANE COMPARE WELL WITH THOSE OF EXPENSIVE COUNTRY CLUBS

cents per day, and from ten to twenty-five cents per game. Golf houses are free to patrons of the course, though in many cases locker charges are made. These vary greatly, ranging from one dollar up to ten dollars per season.

Some cities employ a professional golfer; in a few cases the professional is in full charge, but in most the park foreman is in charge of the course. In a few instances the foreman oversees the upkeep; and the professional oversees the play. Generally the professional is paid a small salary and given the privilege of teaching and selling golf necessities. Sometimes the professional has no salary but the concession of teaching and selling golf goods; and in one instance he pays for this concession.

Women are reported in every case as having the same privileges as men. Year-round seasons were reported in several instances, with the average from April first to December first.

The per capita cost was not given except in a few instances. The per capita

cost on the Spokane course has been 71 cents. There a charge is made of ten dollars for tickets, so that the actual cost to the Park Fund during the season was 30 cents per capita.

Management of the Course

An important feature in the management of a golf course is the rules governing its conduct. The more concise and pertinent the park rules, the more valuable they are. The public will not stop (nor should they be asked) to read a lengthy set of regulations in any form. It should, therefore, be borne in mind when you formulate your rules—boil them down.

The management of the course is a matter that can be decided only by the conditions that obtain in the locality where the course is located. It seems to me, however, that the man to be in charge of the course should be the park foreman, who should be familiar enough with the game to insure his keeping the course at all times in the best of condition. Under his direction and

immediately in charge of the play should be a game director, whose duties should be to regulate the play all over the course. The director should have an assistant known as a ranger, who might well be equipped with a bicycle or a motor-cycle to facilitate quickly getting over the course. Another assistant to the director should be a caddy master, whose duty should include taking care of the caddies and maintaining the proper decorum at the starting point or first tee. Conditions are so different that no two departments may be able to manage their courses alike, and again it largely depends upon the amount of money available for the upkeep of the course.

It is not desirable to have a professional golfer in charge of a municipal course; if it is absolutely necessary to have one for the purpose of teaching, he should have a concession for so doing and for such concession should return the department remuneration in some way.

The Grasses and the Greens

Much might be said about the methods of laying out and building a golf course, the best grasses to use, etc., but again conditions vary greatly, and one section of the country may be entirely different from another. However, the fairways should be deeply plowed and properly graded before seeding. If necessary, they should all have a water system for the dry season. Spokane has to water its course for at least three months of the year. The grasses to use in the fairways differ, although the chief factors of the combination should be bluegrass, red top, creeping bent, English rye and one or more of the fescues—no white clover.

The greens should be perfectly level and not less than seventy-five feet in diameter

though they need not necessarily be all one shape; in fact, it is better to vary them if conditions will permit. Various grasses are used with good success according to locality, but here it has been found that creeping bent and a little crested dogs-tail make a good combination.

A great deal might be written about the general upkeep of the grounds, but that again varies much according to location. In Spokane the course is mowed about twice every ten days during the growing season and the putting greens are mowed and rolled regularly as required. The triplex mower is the most economical; it has a cut of over eighty inches and one horse can handle it easily; besides, one machine will mow the whole course in about two and a half days. Heavy machines like the auto mower are not economical unless the ground is pretty level. Besides, so much rolling as they give is not good for the grass in the hot, dry season.

Every course should have a golf house for the accommodation of its patrons. This house should contain ample checking and locker room, dressing rooms with toilet and shower bath facilities for both men and women, a repair and accessory room and perhaps a lunch counter.

Eighty per cent of the patrons of a municipal golf course are mediocre players and for the best operation of the course, under these conditions, it is advisable to have a course of very little difficulty. This means wide fairways, and the rough as easy as it is possible to make it.

A golf course may be itemized as follows: length, 6,000 yards for eighteen holes; 3,000 yards for nine holes; fairways not less than 200 feet wide; putting greens not less than 75 feet in diameter; tees 6 by 8 feet. This will occupy from 50 to 100 acres actually devoted to the course.

On the Calendar of Conventions

NOVEMBER 13-17.—CHICAGO, ILL.
American Civic Association. Annual meeting.
Secretary, Miss Harlean James, Union Trust Building, Washington, D. C.

NOVEMBER 14-16.—CHICAGO, ILL.
City Managers' Association. Annual convention.
Secretary, Harrison G. Otis, City Manager, Clarksburg, W. Va.

NOVEMBER 14-18.—NEW YORK, N. Y.
American Public Health Association. Annual meeting.
Secretary, A. W. Hedrich, 370 Seventh Avenue, New York, N. Y.

NOVEMBER 14-18.—CHICAGO, ILL.
National Association of Civic Secretaries. Annual

convention. Secretary, Francis T. Hayes, City Club, Hollenden Hotel, Cleveland, Ohio.

NOVEMBER 16-18.—NEW YORK, N. Y.
American School Hygiene Association. Annual meeting. Secretary, Harry B. Burns, M. D., Board of Public Education, Pittsburgh, Pa.

NOVEMBER 16-18.—CHICAGO, ILL.
National Municipal League. Annual convention.
Secretary, H. W. Dodds, National Municipal League, 261 Broadway, New York, N. Y.

JANUARY 17-20.—CHICAGO, ILL.
American Road Builders' Association. Annual convention. Secretary, E. L. Powers, Editor *Good Roads*, 11 Waverly Place, New York, N. Y.

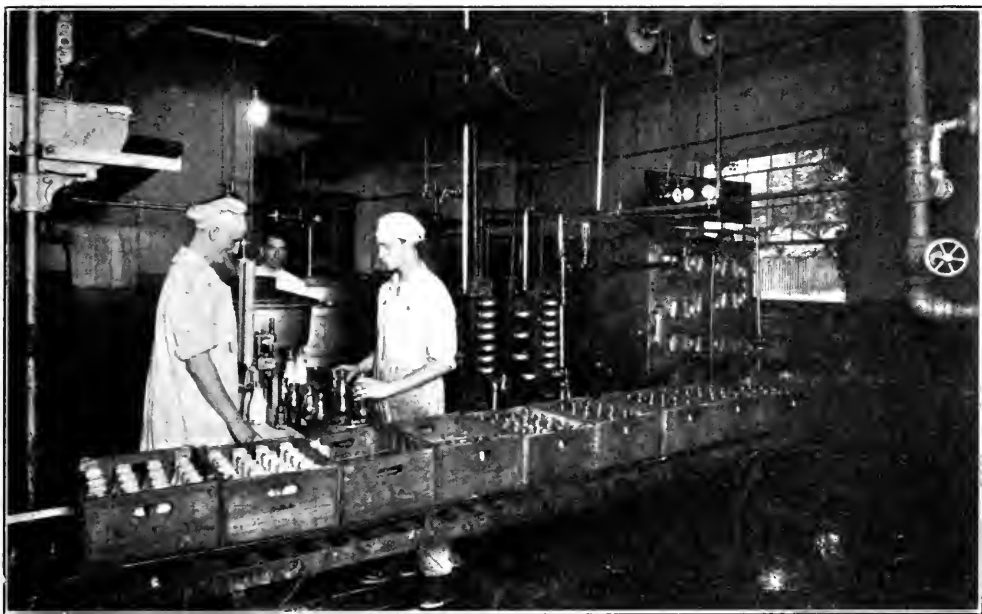
The Quality and Price of Milk

A Valuable Summary from the Report of the Commission on Milk Supply,
Newport, R. I.

THE milk supplied to the people of Newport comes entirely from the farms in Newport County. Up to about two and one-half years ago, the milk was delivered in its raw state by the farmers direct to the consumers. An epidemic of diphtheria and the prevalence of other forms of contagious disease awakened the public to the danger, ever existing, to in-

Pasteurized Milk

During the early part of the nineteenth century, Louis Pasteur, the noted French scientist, discovered that in applying heat to milk, many organisms were destroyed and the product was made safe for consumption. Certain investigators doubted the fact, but after years spent in research work the scientific and medical fields are



INTERIOR OF THE PASTEURIZATION AND BOTTLING PLANT OF THE AQUIDNECK DAIRYMEN'S ASSOCIATION, INC., NEWPORT, R. I.

fants and children, and in many cases to adults, of the consumption of milk in its raw form.

Accordingly, regulations were then passed concerning the pasteurization of milk in this city. Under these regulations but two grades of milk can be legally offered for sale—Grade “A,” which is pasteurized, and Grade “B,” which is certified. Pasteurized milk is the milk which has been treated with the process discovered by Pasteur. Certified milk is the milk which comes from farms, the cleanliness of these farms and the cleanliness of the herds thereon being certified to by the proper authorities.

united in agreeing that Pasteur gave to the world correct information, and the title “Pasteurized” is applied to all heated milk in honor of the man who discovered the process.

The term “Pasteurization” as applied to milk simply means that the product is heated to a temperature of from 142 degrees F. to 145 degrees F., held at this temperature for thirty minutes and immediately cooled to 50 degrees F. The three plants now in operation in Newport have modern, sanitary and up-to-date apparatus.

At the Aquidneck plant the flow type system is used, and the milk is heated by flow-

ing through double coiled pipes. The holder is of the flow type, in which the milk gradually flows for some distance, completing this distance in thirty minutes. The milk then flows through internal tube coolers and from these into a large Milwaukee filler.

The equipment at the Island Creamery consists of a coil pre-heater which raises the milk to a temperature of about 100 degrees F. The milk flows from this heater into a cherry vat in which the heating, by means of coils, is continued to the required temperature. After 145 degrees F. is reached the coils are stopped and the milk is held for thirty minutes. After holding, the milk flows over a surface cooler and from there into the bottle filler.

At the Newport dairy, there is a coil, or flow type heater. From this the milk flows into large tanks, in which it remains for thirty minutes, and then flows over a surface cooler into the bottle filler.

The heating equipment at all three plants is automatically controlled so that only a certain temperature can be applied to the milk. Recording thermometers show the temperature at which the milk is heated and held, and the charts are retained so that they can be available for reference at any time.

Pasteurization is of value from a sanitary standpoint, when market milk is under consideration, because the process affords protection from pathogenic organisms and renders milk safe for young and old.

Dairy Herds

As a result of the investigation in relation to the dairy herds producing the milk supply, it is believed that there is a growing tendency among the herd owners to discard the higher grade of cows, such as Guernsey, Jersey, etc., and to replace them with those of the Holstein breed.

Under present conditions, the producer is paid for fluid milk. The average Holstein cow will give from 18 to 20 quarts of milk a day against a yield of from 10 to 12 quarts a day of the Guernsey, Jersey and other high grade cows. It costs no more to feed and maintain a Holstein than it does a Guernsey, and the result is that the milk producer is interested chiefly in the greater financial returns.

However, one point should be given careful consideration. The Holstein, while giving

ing a greater flow of milk, does not give the quality given by the higher grade cow. The milk of the Holstein is deficient in butter fat as compared with that of the Guernsey, Jersey, etc.

Federal reports and veterinarians state that from 25 to 40 per cent of the milk-producing cows on the island of Rhode Island are infected with bovine tuberculosis. The milk from these cattle, without Pasteurization, is a direct and distinct menace to the health and development of infants and children and probably to some adults.

The Price of Milk

The producers who have appeared before the Commission contend that at the present rates there is no profit in milk production, and if it were not for the fact that most of these producers sell other farm products they could not operate their farms from the money received. The price of milk for the various sections of New England is fixed by the New England Association of Milk Producers.

There is considerable difficulty in arriving at a fair price for milk, according to the capability of the individual farmer, to the size of his herd and whether other farm products are raised by him in addition to the production and sale of milk.

To overcome this difficulty, the New England Milk Producers' Association issues, from time to time, questionnaires which the farmers are requested to fill out. The questionnaires deal with the price of labor paid on the farm, cost of cattle food, up-keep of buildings, the depreciation of buildings and the depreciation in the value of the herd, the manner and cost of delivery, the cost of Pasteurization, the cost of containers and all other items which go to make up the cost of milk production.

The Commission examined about 100 of these signed questionnaires and determined that from a viewpoint of arriving at a fair price for milk, the questionnaires are of little value. There is a wide diversity of opinion as to the value of the estimates on the various items making up the questionnaires. They are signed, but not sworn to, many of the signers fail to answer the questions fully, while others do not answer the majority of questions at all.

The New England Milk Producers' Association established a price for milk to the dairies, said milk to be sold in Newport

TABLE SHOWING BACTERIA COUNTS, BUTTER FAT CONTENT, PRICE, ETC., OF MILK SOLD IN VARIOUS CITIES.

Prices taken from Reports of U. S. Department of Agriculture.

City	No. Specimens Collected for Analysis	Average Bacteria Count	Average Butter Fat	Amount Milk Sold as Pasteurized	Price
Newport, R. I.	4,187	38,524	4.01 %	All except 300 qts. cert. All.	15c.
Brockton, Mass.	Not reported.	427,000 to 670,000	3.87 %		17c.
Fall River, Mass.	Not reported.	Not more than 500,000	Not reported.	About 20,000 out of 30,000 qts. 40 %	17c.
Providence	4,086 950 1,199	159,530 245,000 348,870	3.66 % 3.62 % 3.75 %		17c.
Springfield, Mass.	Not reported.	About 50,000	3.7 %	90 %	17c.
Bridgeport, Conn.	Not reported.	From 3,000 to several millions.	2.2 % to 5.8 %	6/7ths	17c.
Hartford, Conn.	1,788	I depends on sediment test.	3.833 %	3/5ths	17c.
Boston, Mass.	Not reported.	83.35 % under 500,000, balance over 500,000.	3.6 % to 3.7 %	90 %	17c. to 25c.
New Haven, Conn.	Not reported.	Not reported.	3.6 % to 3.7 %	50 %	16c.
Auburn, Me.	Not reported.	No requirements.	State law requires 3 % fat.	Not reported.	Not reported.
Buffalo	Not reported.	Not reported.	3.7 %	All except cert.	16c. to 25c.
Syracuse	Not reported.	Not reported.	3.45 %	Most.	16c.
New York	Not reported.	Grade "A" 30,000 Grade "B" 200,000	3.6 % to 3.7 %	All except cert.	18c. "B" 19c. "A"
Philadelphia	Not reported.	Not reported.	3.6 % to 3.7 %	All.	16c. to 28c.
Trenton, N. J.	Not reported.	100,000	3 to 4 %	Majority.	16 & 17c.
Concord, N. H.	Not reported.	Not reported.	Not reported.	Not reported.	Not reported.
Worcester, Mass.	1,481	50 % over 500,000	3.55 %	Not reported.	17c.
Manchester, N. H.	Not given.	Not given.	3.35 %	Not reported.	Not reported.
Rochester, N. Y.	1,944	907,604	3.5 %	Not reported.	Not reported.
Newark, N. J.	Not reported.	Not reported.	Not reported.	All except that of tested cows.	17c.
Portland, Me.	1,169	71.59 % below 500,000, balance over.	Not given.	13,640 qts. out of 22,525.	15c.

from January 1, 1920, to July 1, 1920 (six months in advance). This price fixing is not binding, as milk may be sold by any farmer at a higher rate than the price set, but no farmer belonging to the Association is allowed to sell milk at a lower price without reprimand. The price of milk to the consumer prior to July 1, 1920, was 15 cents a quart. Since that date the price has been advanced to 17 cents per quart. Of this increase $1\frac{1}{4}$ cents go to the producer and $\frac{3}{4}$ of a cent to the dairies.

The price for certified milk in Newport is from 22 to 25 cents a quart. The butter fat is 4.99 per cent and the bacteria count is 1,698. In Boston the price is 26 cents, the average butter fat is 4 per cent and the

average bacteria count is 4,600. In New York the price is 27 cents per quart, the butter fat percentage is 4 and the bacteria count is 6,300.

The table above shows the price and quality of milk delivered to the people of Newport, as compared with that of twenty other cities in the country. None of these cities show as low a bacteria count or as high a percentage of butter fat, while the price per quart in Newport is lower than in any other city enumerated, except Portland, Me. This table was compiled previous to July 1, 1920. The price of milk has been advanced in Newport since that time, and the prices in other cities have been correspondingly increased.

School Lunches

Lunch-room menus should be so planned that the child with ten cents or less to spend may be able to choose as nourishing a lunch as the pupil who may spend twenty-five cents. The trained dietitian will have no indigestible food on her menu, but will so plan the menus that whatever choice the child makes, a fair balance of food principles is maintained.

—LAURA C. FAWCETT,

Director, High School Lunch Department, East Orange, N. J.

A Public School for "Hookey" Players

By Felix J. Koch

OUT in the yard of a big Cincinnati schoolhouse, every so often, weather permitting, you who pass will see groups of boys at work shaping what seem to be butter-paddles.

Inquire of the first passer-by the reason, and the answer will strike home as a decided paradox:

"Those paddles? Oh yes, they're meant for good use! They'll churn bad boys to good boys. That school is filled with hookey-players, and hookey-players alone!"

To put it more correctly, the informant should state that the school is devoted to confirmed truants exclusively and is known to the authorities as the Special School.

In organization and in relation to the rest of the local school system, the Boys' Special School is quite the same as any other city school. There is a principal, responsible to the Superintendent of Schools; there are two regular teachers for academic subjects, and two special instructors for physical culture and manual training. All of these

are appointed by the Superintendent of Schools, with the Board of Education approving. The school has its janitor; there is the usual appropriation for up-keep from the funds in the hands of the Board. The Special School, however, differs from all other city schools here in existing for the truant alone.

Tracing the Truant

When a child is absent any considerable time from school in Cincinnati, the teacher sends a note of inquiry to the home. Usually this is answered quickly and satisfactorily, but not always. Parents may be ignorant and not really understand its meaning, as read to them by the truant himself. Parents, again, may be careless as to whether the child attends school or not; they had little education themselves, they will say. Parents may be keeping children from school to help them to their own ends. Notes returned may be forgeries of older pupils elsewhere.

If a seemingly genuine answer is not received in due time, inquiry is made of a parent by some child the teacher knows she may trust. Should results prove unsatisfactory, the case is referred to the schools' Truancy Department, and a truant officer investigates. He finds parents ignorant of the real fact of non-attendance, or winking at this.

Every effort is made to induce such parents to enforce school attendance at once. By transferring such children to other schools, other influences often solve this problem. Sometimes they do not. Truancy often seems confirmed in the lad's very nature, and so he is sent to the Special School. If there is parental opposition to this, parent and child are haled to the Juvenile Court on charges of delinquency and contributing thereunto. In court, however, parents will frankly admit that circumstances prevent their forcing the child to obey. Widowed Mother Fabing goes out washing, cleaning—leaving before school-time. If the child breaks his promise and plays truant, there is nothing she can do. Therefore, the boy is sent to the Special



CINCINNATI MAKES BETTER PROVISION
THAN THIS FOR ITS CHILDREN

School for the training he needs.

The School Work

At the school, children are classed as day pupils and boarders. The former report daily, as at any other city schoolhouse, but with the knowledge that any tardiness or absence will be investigated at once. Boys come to know that the school will "get them,"—and this almost immediately,—and so they attend regularly. The most very soon acquire the actual habit of attendance and come to really enjoy school. Some, however, are absolutely incorrigible; they must be kept here against their wills, pro tem.

Boarders are lads whose homes are at great distance, or who come very near to being incorrigibles and must be kept under careful watch. In the school work itself these classes mingle. The eighty-odd pupils are divided into five "rooms." Teachers are not assigned a room apiece, but each hour of lessons a given instructor teaches a different group of boys. Thus new faces among teachers bring along new interest in the lessons; new classes prevent teachers from tiring and relaxing discipline.

All the teachers, moreover, come to know all the boys and can compare notes as to methods with them with profit. As a result of these conferences, far greater freedom is granted in class here than in most city schoolrooms. Class hours extend from 8:45 to 12, from 1 again to 3. But there are frequent short recesses, along with one of fifteen minutes, just to permit of letting off surplus energy. Good, wholesome play, without the proverbial "rough-house," is encouraged then. Whispering, even talking aloud, is permitted at other times, too, except when instruction is being given.

Where at all possible, pupils are placed on honor, in school and out. Gates are ajar here at all times. At noon all pupils living within walking distance of home return there for dinner. Others will eat this meal at school. Day pupils often bring their luncheons along; others buy their snacks in the school cafeteria, where things are sold at cost. Five cents buys a bowl of soup, milk, and a slice of homemade pie. Ten cents buys soup, sandwiches, milk, a whole quarter of a pie—the big treat there.

Paddling

Sometimes, though, all this yielding to boyish natures, wherever possible, fails to bring the results desired. Solomon's advice as to the rod must be remembered then. Rattans are discouraged in Cincinnati schools; they leave welts whose real occasions fond parents and shrewd lawyers exaggerate. So paddles, the ones the boys make in the yard,—wooden blades, resembling much a family dust-pan,—are used instead. Boys name the paddles they carve, and take delight in watching them being used—on *other* boys, of course! Delicate, sensitive constitutions are rare among the lads here, so paddlings are administered when required, but always with the reason stated before all the class, so that the justice of the punishment may be known, and with the paddling in public, so that the boys may see the teacher plays no favorites!

After school, non-boarders may go home. Parents grow solicitous, once a boy is at this school, and will often meet the lads at the gate. They fear the influence of the "many bad boys," though this is often less evil than the influences tolerated so long before. The boarders remain in the neighborhood, playing outdoors, or in the "gym," skating, taking a walk sometimes. Later they attend to chores, cut wood, build fires; especially do they like to help in the kitchen, for it allows of receiving no end of snacks of which there will not be enough for all. Supper is at six; then comes playtime and bed at eight.

Boarders are sent home in June, when all schools close, to remain until the autumn, when all cases here are reconsidered. Where home environment warrants, the boarders are promoted to day-pupils, the day-pupils returned to their former schools. Sometimes the boarders must remain here—and not always through their own fault. Sometimes, too, truants are such pronounced delinquents that nothing remains but to commit them to the Boys' Opportunity Farm in the hills.

Those last, though, are the rare exceptions. Instead, the boys at the Special School, one and all, come to feel that with each one of them the school itself and its unique liberties are upon trial. *Esprit de corps* brings them to love the school, love the teachers who strive to win them from their old ways for their good.

What Makes an Efficient Health Department?

By Matthias Nicoll, Jr., M. D.

Deputy Commissioner, State Department of Health, Albany, N. Y.

IT is only in recent years that the importance of the duties of health officers has come to be realized by the public and governing officials. Only a comparatively short time ago the health officer was apt to be regarded as a sort of necessary evil sanctioned by the observance of a time-honored custom, and his duties consisted largely in posting placards on quarantined premises and making more or less successful attempts to stop the spread of infectious diseases before they became epidemic. By many people he was thought to be more of a nuisance than those which he was occasionally called upon to suppress. His salary was usually the minimum permitted by law, and grudgingly provided for in the municipal budget.

The actual position of the average health officer, while not materially better to-day than formerly, gives promise of a brighter future, largely by reason of the greatly increased value which public opinion has learned to place upon the duties of his office, such value in any city being directly proportionate to the efficiency and tact with which the local officer performs his work.

By abolishing boards of health and intermediary officials, and making the health commissioner or health officer the head of a department, responsible for the proper performance of his duty only to the public and the mayor or other municipal chief or body, the health officer is immediately thrown into the limelight, must assume full responsibility for his acts, and can neither take refuge behind, nor be hampered by, a board or another municipal officer. The value of a medical board or a commissioner of public safety to a health officer may at times be apparent; but there have been sufficient examples of non-coöperation, indifference, or actual hostility to warrant the discontinuance of their authority over matters pertaining to public health, especially since the New York State law provides for an advisory board of physicians to whom the health officer or commissioner may look for guidance and counsel when he so desires.

Term of Service

A term of service of four years is provided for in New York State cities unless the health officer be sooner removed by the appointing power. This is a step in advance, since it lengthens the term of office, and no longer makes it coterminous with that of an existing administration; but the term is not long enough. It should be, and before long will be, for life, the health officer being removable only after a hearing on sustained charges of neglect of duty or other causes.

Public health administration is a specialty, and one which requires much study and long experience, independence, tact and good judgment. The health officer should have a thorough knowledge of hygiene and sanitation, and be perfectly familiar with his powers and duties under the public health law and state and local sanitary codes, which to-day deal with practically all matters relating to the physical, mental and social welfare of the people.

Not a Political Job

The most valuable asset of a municipal administration is a good health official. When such a one is found, he should be retained. No political expediency should be allowed to govern his retention. Whether he be a Republican, a Democrat or an Independent may be of momentary, strategic importance, but the only requisite that counts with the people at large, and should count with wise political leaders, is efficiency. Disease, suffering and death are non-partisan, and these are the things which the health officer is appointed to prevent. On the other hand, however much a partisan he may be, the health officer should not, in my opinion, be politically active, and under no circumstances should political considerations be allowed to influence or modify his official acts. The ability to find qualified men will depend not only upon the amount of salary, but even more on the certainty of tenure of office.

ACKNOWLEDGMENT.—From a paper read before the Mayors' Conference, at Corning, N. Y., June, 1921.



MOTORIZED FLUSHING AS SHOWN ABOVE WITH A "SOUTH BEND" UNIT IS USED EXTENSIVELY IN AMERICAN CITIES

Street Cleaning Problems in Minneapolis

Part II

Abstract of Important Report Prepared by Minneapolis Civic and Commerce Association

Comparison of Gravity Flusher, Horse-drawn Power Flusher, and Squeegee

The city owns no teams for street cleaning purposes and conducts no municipal stables. All teams are privately owned and are hired for street cleaning purposes, and in nearly all cases the drivers are paid at \$8 per day.

In some cities it is thought that better results are obtained by sprinkling the pavements previous to flushing. In Minneapolis, where the white wings are constantly doing pick-up work, it is probably a useless expenditure to sprinkle the streets before flushing. Some cities have instituted this practice because it is believed that the dirt and refuse is softened by sprinkling, so that a cleaner surface is obtained when the flusher passes. This does not seem necessary here, however, because Minneapolis hand patrols do an extensive pick-up work.

During the field study covering a period of over one month, some astonishing results and data were obtained. The following table shows the square yards cleaned per hour and the gallons of water used per 1,000 square yards on the principal "heavy-traffic" streets. Figures in this table show the work which was actually accomplished.

	Square Yards per Hour per Machine	Gallons per 1,000 Square Yards
AVERAGE		
Gravity flusher.....	3,839	1,725
Power flusher.....	9,910	516
Squeegee	4,203	760

By way of comparison of costs of flushing by the various types of machines used in Minneapolis, the following figures are given:

COST OF GRAVITY FLUSHING	
Two teams at \$8.00.....	\$16.00
Three men at \$4.00.....	12.00
Depreciation at 20 per cent on two machines valued at \$600 each for 200 flushing days per year	1.20
Total cost per day per crew.....	\$29.20

On the basis of 3,939 square yards per hour per machine, and using a 7-hour flushing period, cost equals \$.53 per 1,000 square yards.

COST OF POWER FLUSHING	
Two teams at \$8.00.....	\$16.00
One hydrant man at \$4.25.....	4.25
Fuel (9 gals. gas and 1 qt. oil).....	3.00
Depreciation at 20 per cent on two machines valued at \$2,000 each for 200 flushing days.	4.00
Total cost per day per crew.....	\$27.25

On the basis of 9,910 square yards per hour per machine, and using a 7-hour flushing period, cost equals .196 per 1,000 square yards.

NOTE.—This cost, however, is much lower than the actual cost to the city, because the crews work only a little over one-half the time for which they are paid. The night power flushing crews actually work between 3½ to 4 hours to cover the areas assigned to them, and on account of the lack of proper supervision this practice is allowed to continue. The cost of cleaning by this method, because of the crews' working less than 4 hours and being paid for an 8-hour day, amounts to between \$0.30 and \$0.35 per 1,000 square yards.

COST OF SQUEEGEING	
Two teams at \$8.00.....	\$16.00
Three men at \$4.00.....	12.00
Depreciation at 20 per cent on two machines valued at \$1,200 each for 200 flushing days per year	2.40
Total cost per day per crew.....	\$30.40

On a basis of 4,203 square yards per year per machine, and a 7-hour flushing period, cost equals \$.515 per 1,000 square yards.

The depreciation of 20 per cent is no doubt high, as the machines actually last much longer than 5 years, but this is the figure used by the department. No water charge is made against the Street Cleaning Department and none is therefore included, although there is some cost to the city.

By taking the average distance traveled per hour for each machine as computed from the schedule of routes followed during the cleaning operations, and using the effective cleaning width for one trip of each of the various types of machine, the yardage which these machines should clean has been computed. The time used in the computation includes both the actual flushing time and the time for filling the tanks.

1. The average speed of the *gravity flushers* was computed to be 2,237 yards per hour. With an effective cleaning swath of 2 yards per trip, with 1 nozzle, which is the general practice, the gravity flusher should clean 4,474 square yards per hour.

2. By taking the average of several *power flushers* on different routes, it was found that these machines travel 2,867 yards per hour. The difference in distance traveled is due to the fact that these machines use less water and therefore less time is taken at the hydrant for fills. Using an effective cleaning swath of 4 yards per trip for 1 nozzle, these machines could clean 11,468 square yards per hour.

3. The average distance which *squeegee* machines travel was found to be 2,673 yards per hour. Using an effective cleaning swath of 2 yards, these machines should clean 5,146 square yards per hour.

The following data have been computed to show the amount of water necessary for cleaning 1,000 square yards, on the basis of a properly worked out schedule of cleaning streets of various widths to obtain the most

efficient results with the least possible number of trips on the streets:

1. *Gravity Flushers*.—By taking the average of the number of tank loads of water used in a certain flushing distance traveled per machine and assuming 900 gallons per load, the gravity flusher need use only 1,320 gallons per 1,000 square yards cleaned.

2. *Power Flushers*.—By taking the average of the number of tank loads of water used in a certain flushing distance traveled per machine and assuming 825 gallons per load, the power flusher need use only 418 gallons per 1,000 square yards cleaned.

3. *Squeegees*.—By taking the average of the number of tank loads of water used in a certain flushing distance traveled per machine and assuming 485 gallons per load, the squeegee need use only 602 gallons per 1,000 square yards.

The tables at the bottom of this page show work done and costs for other large cities, the figures being obtained from the Philadelphia Bureau of Municipal Research, which has also recently conducted an extensive study of street cleaning activities.

The work in all the cities listed below is done by municipal forces, with the exception of the vacuum cleaning in Los Angeles and St. Louis, which is done by contract.

Miscellaneous Problems of Street Cleaning

The Proper Time for Flushing.—There are many general problems which enter into street cleaning work, one of which is the proper time for flushing. In the outlying districts where the traffic is not so congested, a large percentage of the flushing is done during the daytime. Day flushing was also employed on some of the down-town streets the early part of the season, but this

COST PER 1,000 SQUARE YARDS OF PAVING CLEANED ONCE, NOT INCLUDING SUPERVISION AND OVERHEAD

Year	Cities	Power Flushers	Gravity Flushers	Squeegees (Kindling)	Motor Flushers	Vacuum Sweeper	Machine Brooms	Hand Patrol	Hose Flushers
1919	Washington, D. C. ....	.....	\$0.50	\$0.23	\$0.36	.....	\$0.35	\$0.26	.....
1919	Akron, O.	None	None	None	0.35 & 24	None	None	0.56	.....
1919	Rochester, N. Y. ....	.....	0.263	None	0.172	None	.....	0.31	\$0.766
1918	Cleveland, O. ....	.....	.....	.....	.....	.....	.....	0.31	.....
1919	Toronto, Ont.	None	None	None	0.17	None	None	0.43	.....
1919	Columbus, O.	\$0.595	None	None	None	None	0.32	0.40	.....
1919	Los Angeles, Calif.	None	0.1485	None	0.1485	\$0.1050	None	0.10	.....
1920	St. Louis, Mo.	None	.....	.....	.....	0.71	.....	.....	.....

SQUARE YARDS OF PAVING CLEANED PER HOUR PER MACHINE BY VARIOUS MACHINES

Year	Cities	Power Flushers	Gravity Flushers	Squeegees (Kindling)	Motor Flushers	Vacuum Sweeper	Machine Brooms	Hand Patrol	Hose Flushers
1919	Washington, D. C. ....	.....	10,000	.....	20,000	.....	11,250	.....	.....
1919	Akron, O. ....	.....	.....	.....	8,150	.....	.....	.....	.....
1919	Rochester, N. Y. ....	.....	?	.....	13,000	.....	(a)	.....	.....
1918	Cleveland, O. ....	.....	.....	.....	.....	.....	.....	.....	.....
1919	Toronto, Ont. ....	.....	.....	.....	14,784	.....	.....	.....	.....
1919	Columbus, O.	7,000	.....	.....	.....	.....	7,000	.....	.....
1919	Los Angeles, Calif. ....	.....	3,750	.....	12,500	23,400	.....	.....	.....

(a) 4,000 to 9,000 square yards.

practice was discontinued on account of the density of the traffic and also the danger to which this traffic was subject on the slippery streets. Flushing in the Fifth Ward, however, starts at 5 o'clock in the afternoon. At this time of the day, traffic on any of the streets is extremely heavy, and the wet streets make a considerable menace. In the Fourth Ward in the down-town districts flushing starts between 7 and 8 o'clock in the evening, and also on Lake Street in the Eighth Ward. Some of these streets carry extremely heavy traffic during the evening hours, and in many instances it was ob-

months due to the number of trees on the Minneapolis streets. In very few cases is there any deviation from the set routes and schedules of flushing during the fall months, and the leaves on the streets are flushed into the gutters and very often into the catch-basins. Some of the crews have gutter sweepers with them, who take care of a large part of the leaves, but can by no means handle all of them. During this period the teams, instead of being used for flushing, should be put to work collecting leaves and litter, thus lessening the number of flushings per week.



A MOTOR FLUSHER USED BY THE CITY OF OTTAWA, CANADA

served that the flushers caused heavy traffic congestion on this street.

The best time for flushing and cleaning the streets is after 11 o'clock at night and during the night, after the heavy evening traffic and theater traffic are off the streets. When such proposals have been made before, however, it has been argued that it is hard to obtain men for night work. Many of the wards are able to obtain men for night cleaning work, and it seems that the only reason for flushing streets during the heavy traffic is because this is left to the discretion of the individual street commissioners.

The Disposal of Leaves.—Another problem of street cleaning is the disposal of the large quantity of leaves during the fall

Quantity of Street Dirt Collected

No records have been kept by the Street Cleaning Department showing the amount of street dirt collected during the season or over any other period of time. The several wards employ pick-up teams to collect the street dirt according to the volume of dirt to be collected and the need for collection. The Fourth Ward, including the greater share of the down-town district, hauls about 50 loads of dirt from the streets weekly in 2- and 3-yard dump-wagons, but no record is kept of the total yardage of dirt hauled in all wards.

The Sixth Ward dumps the street dirt collected on private property for filling purposes and receives 10 cents per load of 1½ yards of dirt for each load dumped.

Alley Cleaning

Another point that comes under the street cleaning activities of the city and needs a great deal more attention than it now receives is the alley cleaning in the outlying districts. Although property owners are required by health ordinances to keep their alleys in a clean and sanitary condition, there is opportunity for a great deal of improvement. Proper police coöperation and the power of the street commissioner to act as a sanitary inspector would tend to improve these conditions.

In the down-town districts, alley cleaning is taken care of by the white wings. Some of the alleys are kept in a fairly clean condition, but in general large piles of litter and paper are deposited in the alleys, and this makes them very unsightly. Such conditions could easily be bettered by proper ordinances and ordinance enforcement.

Street Sprinkling

Street sprinkling is one of the main activities of the Street Commissioner, and although not considered a form of street cleaning, in many cities is used as an aid to street cleaning. The principal function of sprinkling is to prevent the blowing about of objectionable dust. This city employs two methods of street sprinkling:

1. Water sprinkling is used on a certain percentage of pavements and also on some of the dirt streets.

2. Oil sprinkling, however, has replaced water sprinkling on a very large percentage of the dirt streets of the city. It has been considered that a much better roadway can be maintained with oil sprinkling than with water sprinkling where the streets are kept in proper repair. Two or three oil sprinklings per year require approximately the same expenditure that the necessary amount of water sprinkling would cost in order to properly lay the dust.

Water sprinkling is done locally by ordinary horse-drawn sprinkling carts on all kinds of streets—pavement, dirt, cinder and macadam. Some paved streets are sprinkled where there are car tracks, and in some cases the whole street is sprinkled. Many complaints have been submitted on sprinkling paved streets which are also flushed.

In freezing weather calcium chloride sprinkling is substituted for water sprinkling on certain streets of the city. In moderate weather about 600 pounds of calcium chloride per 600-gallon tank of water is used. In colder weather this is increased

to about 900 pounds per 600 gallons of water.

The whole cost of street sprinkling, amounting to between \$250,000 and \$275,000 per year, is assessed directly against the abutting property owners on a frontage basis.

Section 16, Chapter VIII, of the new city charter reads as follows:

Street Sprinkling.—"The City Council shall have power to sprinkle the streets, avenues and public grounds of said city, or any part thereof, and make contracts for so sprinkling such streets, avenues, public grounds or district of said city as it may deem best, for any time not to exceed three (3) years, on such terms and conditions and for such portions of each year as it may deem best.

"Water for such sprinkling shall be furnished from the city water-works free of charge. The supply of such water shall be deemed the proportion of the expense for such sprinkling, for the street crossings and all parts of such streets fronting on land exempt from assessment. The whole cost of sprinkling such portion of the street shall be levied and assessed upon the lots and lands fronting upon that part of the street so sprinkled and which are subject to assessment, by an equal rate per front foot of said lots and lands. Such levy shall be made annually."

In addition to the amount charged against the property owners, between \$15,000 and \$20,000 per year is charged against the street railway company for sprinkling its right of way.

It is estimated that about half the cost of sprinkling is applied to oil and the other half to water sprinkling. It was impossible, however, to obtain the exact expenditures for the two objects from the records available on this work.

A certain part of the sprinkling fund is used to defray the expenses of flushing. Flushing is considered to have the same effect as sprinkling, to the extent that such a transfer of funds from the special assessment to defray the cost of street flushing is apparently legal. It is recommended that because of continual complaint on the part of street commissioners of a shortage of funds, all water sprinkling on paved streets be discontinued and a larger percentage of sprinkling funds be transferred to the ward funds for ward purposes, allowing more money now used for flushing to be diverted to other purposes.

New Methods and Equipment

Machine Sweeping.—Sweeping streets by machine brooming has been practically discontinued in Minneapolis during the last few years. It was used quite extensively in the past, but flushing and squeegeeing work has almost entirely replaced the old method. In the spring, however, these sweeping machines are used for the first spring clean-up

and also somewhat during the summer on the old rough granite block. In the fall they are at times used for sweeping fallen leaves, but generally their use has been abandoned. No cost data have been compiled on this form of street cleaning, but experience has shown that the cost runs quite high, if this method is used generally, and flushing is much more economical. The above applies only to the old-style rotary brooms carried on four wheels and horse-drawn. There are, however, on the market at the present time several new types of street sweepers and street cleaning machines which will bear investigation and detailed study. One of the main objections to the old style of street sweeping machine, in addition to its high cost of operation, was the creation of clouds of dust when sweeping. The old-style machine also did no more than sweep the dirt into furrows, which was later collected by pick-up teams. These objections, however, have been overcome in the newer machines.

The machines include all operations in one. They are motor-driven and travel from 4 to 6 miles per hour. They are so equipped that they sprinkle the street before sweeping and also include a gutter sweeping attachment. The refuse is collected when swept by the machine itself, so that all operations are included under one power-plant and operated by one man. Reports from other cities have shown the cost of street cleaning by this method to be extremely low, and the city of Minneapolis would do well to make a detailed investigation of the working qualities and cost of operation of such types of street cleaning apparatus.

Vacuum Sweepers.—In addition to the street sweeping machines mentioned above, there is one type of street cleaning apparatus known as the "vacuum sweeper." The cost of street cleaning by this machine is considerably higher, but, on the other hand, it has its advantages under certain circumstances. The machines are not very extensively used throughout the country, as in most cases where they are used the contract system is employed. The manufacturers of one type of machine wish to make a contract with the city using their machine and have refused to sell or lease any of the machines, basing their refusal on their desire to use their own trained operators in order to make the machine a success.

This machine can be used only in dry weather on dry pavement. It would be most valuable, however, during the cold weather when it is impossible to flush the streets, and especially during the winter months. If a so-called "dry zone" should be established in the down-town districts, where snow was completely removed from the streets, this machine would be very good for removal of dirt and dust.

Motor Flushing.—One of the up-to-date machines used in the street cleaning practice is the motor flusher. Minneapolis has as yet tried out none of these machines. The motor flusher can work a great deal faster at a lower cost, and does not require the employment of so large a force. Data on motor flushing obtained from other cities using motor flushers give strong justification for an investigation of what the motor flusher can do. With centralized control and proper supervision tending towards better economy in street cleaning work, there is no doubt that the more modern machinery for street cleaning purposes should be investigated and tried out.

Statistics from a report of street cleaning in the city of Rochester, N. Y., by the Rochester Bureau of Municipal Research for October, 1918, showed the motor flushing costs to be extremely low. These costs are no doubt somewhat higher at present, but will at least show a materially lower cost of flushing by motor flushers. The flushers used in Rochester are from 12 to 15 hundred gallons capacity and travel at an average speed of from 8 to 12 miles per hour. The average cost over the season per 1,000 square yards cleaned once was 9.6 cents. The machines also averaged about 350 gallons of water per 1,000 square yards.

Need for Ordinance Reform and Public Coöperation

There is nothing which will tend to reduce the quantity of dirt and litter deposited on the Minneapolis streets so much as coöperation on the part of the public and of the police department. Ordinances should be provided, and enforced by the police department, prohibiting throwing papers and dirt on the streets. In the business district one of the principal sources of street litter is newspapers and newspaper wrappings blown about by lack of care on the part of the public, and particularly the newsboys.

In the residential districts, especially in the spring and fall of the year when people are raking their lawns, piles of refuse, leaves, lawn grass, etc., are raked into the street gutters and left for city collection. This practice makes the streets extremely unsightly, and inasmuch as a large share of this is done on Saturday afternoons, the rakings are often uncollected for days at a time. It also makes an additional burden for the city which rightfully should be borne by the individual property owner.

Another source of street dirt in the downtown district is the store owners. In many cases the dirt on the sidewalks in front of the down-town stores is swept early in the morning into the gutters, after the flushing

crews have passed during the night. On days when there is a heavy wind, this dirt is blown about and the air is filled with dust, creating a very bad health menace.

There are many other unnecessary sources of street dirt which should be done away with, and public coöperation and police enforcement will help to eliminate them.

EDITORIAL NOTE.—Our attention has been called to an error on page 293 of the October, 1921, issue of THE AMERICAN CITY in Part I of the article, "Street Cleaning Problems in Minneapolis." The last sentence of the first paragraph on page 293 should read: "The cost of cleaning 1,000 square yards once amounts approximately to 5.5 cents." The low cost of 5.5 cents for hand cleaning is due to the fact that the men do only pick-up work and do not completely sweep the street. We are indebted to A. H. Douglass, Engineer, Minneapolis Civic & Commerce Association, for this correction.

Electric-lighted Islands at Bad Curve

By Charles Alma Byers

AT Ottawa, Ill., there is a thoroughfare much traveled by motorists that, in one of its approaches to the bridge spanning the Illinois River, curves rather sharply for some distance along a high, traffic-obscuring concrete wall. To provide room for the roadway, which has been paved with brick, it was necessary to cut into the side of a hill and hence build the retaining wall just referred to. The roadway at this point also possesses a considerable grade, which becomes a special incentive to the motorists traveling in the upward direction to speed.

As a means of guarding the traffic against accidents through collision, the course here

has been marked with four electric-lighted "islands" of the kind shown in the accompanying illustration. These, either day or night, keep the opposite-going lines of traffic separated and held safely to the right. The protection has been in use for several years, and it is claimed that not a single collision has occurred.

The concrete "islands" are about 14 inches high and approximately 6 feet long. They are tapered to a point at each end, and in the middle have a maximum width of 12 inches. The light standards are of black cast iron, and a single large frosted light globe caps the top of each to direct the traffic at night.



DURING THE SEVERAL YEARS THESE "ISLANDS" HAVE BEEN IN USE NEAR OTTAWA, ILL., NO COLLISIONS HAVE OCCURRED HERE

Forward Steps in Municipal Affairs

Park Departments

Public Care for Public Property

CHICAGO, ILL.—Public parks and playgrounds, the beauty spots of our cities, are seriously affected by the prevailing spirit of popular indifference. This lack of respect for public property is partly due to ignorance of the time, service and money needed to build and maintain these places of health and comfort. Because parks are free, license seems to be mistaken for liberty.

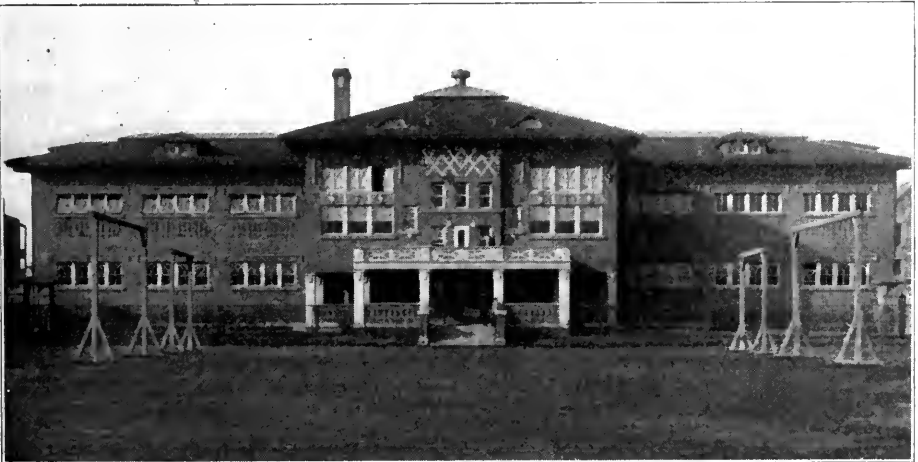
The Board of West Chicago Park Commissioners has taken notice of this fact in its system of parks and playgrounds, and has supplemented its measures of discipline by a method of education. Early this spring the following letter was sent to all the schools, churches and organizations in the West Park district:

"The great West Side of Chicago contains a system of parks, playgrounds and boulevards which have attained a world-wide celebrity for their beauty and the public and community spirit which they evince.

"The citizens of the West Side have, through taxation, generously contributed to the up-building and maintenance of eighteen parks and thirty-three miles of boulevards. Their care should be a matter of personal interest to every citizen, without exception.

"Unfortunately, however, there seems to be a lack of proper appreciation of these beauty spots. During the past few years the Board of Park Commissioners have been repeatedly informed of the increase in destruction of and damage to the trees, shrubs, flowers, lawns, buildings, park furniture, etc. This vandalism is, for the most part, the work of children, but is also occasionally committed by adults.

"You are near one of the parks or in the vicinity of the boulevards, and we believe that you are interested in the preservation of these places of beauty and pleasure. We ask your coöperation in bringing this matter before the children under your jurisdiction and your influence in establishing a better community spirit among the younger generation.



RECREATION CENTER, HOLSTEIN PARK, CHICAGO

The facilities of this park have been developed to make possible the fullest coöperative use of the park and the adjacent public school

"Can you not instill in the hearts of the children a love for the beautiful, and teach them to regard public property with the same care which they give to private possessions in their own homes?"

"Your coöperation in this matter will result not only in more beautiful and attractive parks but in a foundation for good American citizenship."

This letter was followed up two weeks later by personal visits and brief addresses to the children, and before the schools closed another letter of this character was addressed to these same agencies.

So far the response to this circularization has been encouraging. Less damage has already been observed, and the attitude of the children in general seems to increase in care and watchfulness. It is known that hundreds of children repeated the contents of this letter to their parents, for telephone messages of appreciation have come from a number of them. Again, many of the children reported to the men immediately in charge of the parks that a letter from the President of the West Park Board had been read to them in school and that they intended to be more careful and help "their" park. In some high schools the Civic Industrial Clubs undertook to assign to their members the parks, playgrounds and boulevards in their school district for vigilance and "junior police" service. They even proposed to give written reports from time to time as to results achieved.

There is a need for instilling in our younger element a greater sense of appreciation of park property. The present unrest has disturbed this sense. Measures of discipline do not suffice for this purpose; hence means of education are needed. We are hopeful of our attempt in this respect, and commend it to others.

CHRISTIAN F. WIEHE.
President, West Chicago Park Commissioners.

Public Welfare Departments

How One Small Town Has Acquired a Community Home

MCGREGOR, IOWA.—A year ago a movement was started by the Community Welfare Association of McGregor, a town of 1,400 inhabitants, to raise money and build

a community home. It was found that a building for the benefit of tourists and for the use and enjoyment of the resident population, equipped as desired, would cost from ten to twelve thousand dollars. The town had been financing so many civic projects in the way of paving, sanitary sewer, white way, bathing beach, athletic park and other things that it seemed impossible to raise such an amount.

Then, one day, somebody had an inspiration. One of the oldest buildings on McGregor's Main Street is a two-part, three-story structure belonging to the Masons. The two third floors are connected and were the lodge rooms. The second floors were rented out as separate living apartments. The lower floors formerly housed successful retail businesses, but the business center had moved further up the street, and the rooms had been in poor demand. They had degenerated so that one had been used as a carpenter's shop and the other as a sort of second-hand junk establishment. They were dirty, disorderly places, and eyesores to the community.

One of the members of the Community Welfare Association had the idea that the two lower floors of this building, if made to open into each other and fixed up, could be transformed into an attractive suite of community rooms. The thought was mother to the present community home, which is so satisfactory that the Association believes it is better to have filled the need of a community center in this way than to have erected a building.

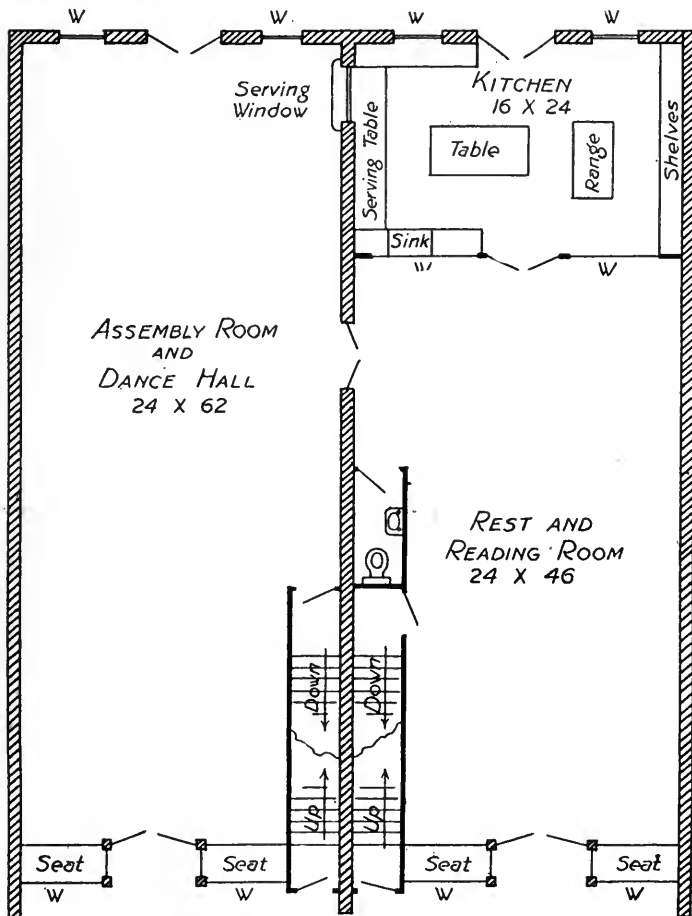
The Masons, on the Association's signing a three-year lease at a rental of \$420 annually, vacated the lower floors and put them in the hands of carpenters, decorators and plumbers. The two floors, 62 feet long by 24 feet wide, are separated by a brick wall. A wide arch was cut in the middle of this, throwing the two floors together. Running water and a pipeless furnace were put in. The west floor was made an assembly room and dance hall. The front two-thirds of the east floor became a rest and reading room, and opening into it with double doors is a kitchen fully equipped with tables, ranges, sink, cupboards, kitchen utensils, and dishes for serving a large number.

The walls of the hall and rest room are decorated in tans and browns, and the high front windows have draperies to harmonize. The lighting is indirect. The hall has a

hard maple floor, electrically smoothed. A small stage which can be set up and taken down as needed is a part of the equipment of the hall; the Association is paying for it on the installment plan. The rest room has a large reading-table with current magazines, a writing-table, easy chairs, and a number of card tables. Long tables to bring out for serving and a couple of hundred hall chairs complete the furnishings.

The Masons have spent \$2,500 in fixing over the rooms. The Community Welfare Association has put \$1,000 in furnishings. The Commercial Club and the American Legion will use the rooms as club rooms for regular meetings and special functions, paying the Community Association \$100 apiece for the privilege each year. The rest of the rent, salary of the matron in charge, and other expenses will be defrayed by renting the hall for entertainments. The public school will have such privileges free.

The six evenings of a single recent week were on the following schedule, beginning Monday night: a lecture on rural sociology by a professor from a state university; a sewing demonstration given by the Rural Community Club to town and country women, a demonstrator of the Iowa State College conducting the meeting; a conference of the American Legion and others on the celebration of Memorial Day with a parade and open-air exercises in the city park; a banquet given by local railroad men to visiting officials of a railroad, the Community Welfare Association serving the banquet; a dancing party given by the boys of the manual training department of



THE CONVENIENT ARRANGEMENT OF THE MCGREGOR, IA., COMMUNITY HOME

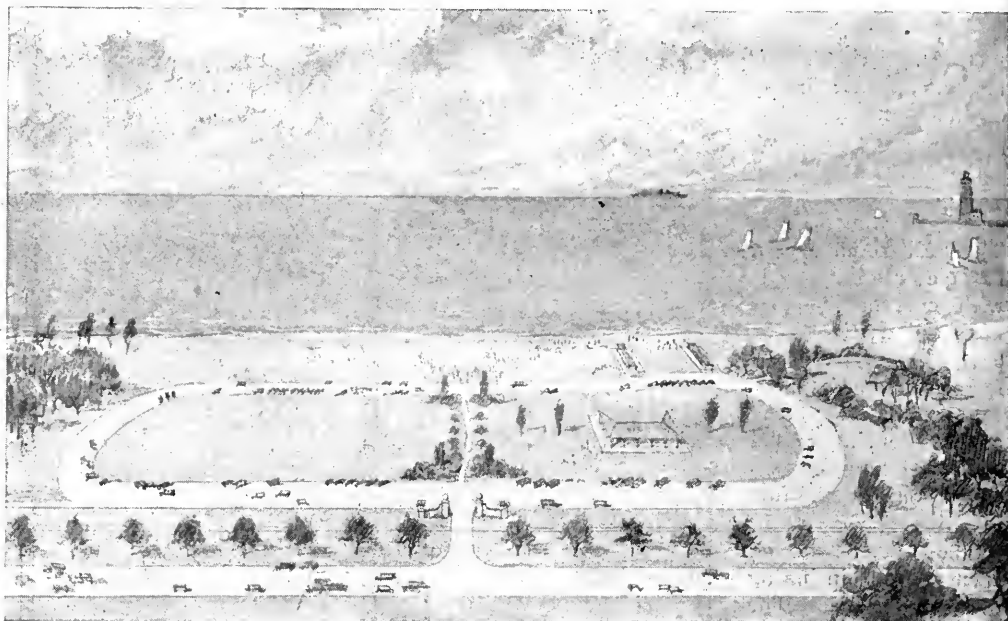
the public school to raise money for the purchase of wireless apparatus; and a party for boys and girls between the ages of nine and fourteen.

GEORGIA M. ELWELL,
Chairman, Community Welfare Association.

Highway Departments

City Presents Park to State

GRAND HAVEN, MICH.—This city has contributed a great civic improvement in an unusual way. It has purchased and presented to the Michigan State Park Commission one of the most valuable park sites along the shore of Lake Michigan. This consists of a ten-acre tract of broad, clean



THIS ATTRACTIVE PARK HAS BEEN PRESENTED TO THE STATE PARK COMMISSION BY GRAND HAVEN, MICH.

sand beach. It is located at the terminus of Trunk Line Highway No. 16 and at a point on Trunk Line Highway No. 11, the latter being known as the West Michigan Pike. This makes the beach accessible to the motoring public, as both of these highways are paved down to the entrance of the park. Thousands of motorists from almost every state in the Union flock to Michigan every summer. These visitors, together with the Michigan tourists, constantly seek access to the beaches along the lakes. At most points nature has barred access through the great bluffs and huge sand dunes.

The Grand Haven State Park is one of the few points where public improvements have been carried on to an extent that has overcome these barriers, and the tourist easily reaches the lake over a fine pavement. Private interests heretofore have monopolized the more accessible points to the lake front and the movement of the State Park Commission is giving to the public privileges which should have never been denied it, these privileges being the right to enjoy the great gifts of nature so lavishly bestowed on the state of Michigan. The paving at the state park for the accommodation of the many visitors consists of a great concrete oval 2,150 feet in length with a paved width of 25 feet, to be ultimately widened to 50 feet. Parking space for automobiles

is provided around the entire oval and 2,500 cars were parked there the first Sunday following the opening day. The park was opened June 26, 1921.

The ultimate plans of the local Park Commission include the erection of bath-houses, comfort stations, playground equipment and a commodious shelter house. A life-saving patrol of some kind will be established for the protection of the thousands of bathers. A landscape architect has in charge the beautification of the park by planting ornamental shrubbery and such trees as can be induced to grow in the clean, smooth sands common to the Lake Michigan beaches. The present city-county highway connecting with this park will ultimately be projected as a boulevard northerly and easterly to form a concrete loop about the city and will provide a choice of routes to the park.

The construction of the State Park at Grand Haven is only a part of a large plan laid out by the Michigan State Park Commission, of which Mr. Fred Pantlind of Grand Rapids is an aggressive member. The Ottawa County Road Commission encourages and lends its aid to all public improvements that in any way benefit the motoring public and it has been an important factor in this particular instance.

WILLIAM M. CONNELLY,
Member, Ottawa County Road Commission.

Massachusetts Cities Believe in Public Works to Alleviate Unemployment

FOLLOWING are extracts taken from some of the letters written to Governor Cox of Massachusetts in reply to his letter* to the mayors of cities, selectmen of towns and county commissioners, relative to unemployment:

BEVERLY.—The city of Beverly has been doing a vast amount of road, sewer, and water work, these undertakings giving employment to many of our citizens. It is perhaps true that this work could have been done cheaper in the near future, but unless these citizens were employed, it would have been necessary to care for them through the agency of our Poor Department. I therefore am of the opinion that the city's money has been wisely expended. Another project is about started—that of building a high school, to cost about \$750,000. It is intended to have the city of Beverly give work to its citizens by doing the necessary excavating and grading under the direction of our Commissioner of Public Works.

BOSTON.—I can assure you that every effort is being made by the city of Boston within its financial capability to inaugurate new construction. No stone will be left unturned to provide employment in municipal activities.

CAMBRIDGE.—I am very glad to inform you that the city at this time is doing everything it possibly can to help the unemployed and relieve conditions. We have quite a little work mapped out ahead and intend to continue on necessary public improvement. It is my intention, as Mayor of Cambridge, to give every assistance.

LOWELL.—The city this year appropriated more money for its streets and sewer construction than ever before, and is erecting two very expensive buildings, all of which was done with one thought in mind—to care for the unemployed.

MALDEN.—May I say that we have ap-

propriated more money than usual this year for street and sewer work for the particular purpose of keeping as many of the unemployed as busy as possible. We also plan to carry on our sewer work as early in the season as is possible. Early in the spring we secured permission from the Legislature to borrow money outside the debt limit, for the purpose of carrying out a street paving and sidewalk program. We have already started this work and have given many men employment, and it has helped conditions in this city very materially.

TAUNTON.—In this city we have been making municipal improvements, consisting mainly of street and sewer construction, for a considerable time, mainly for the purpose of providing work for the unemployed. We propose to continue the program during good weather.

WOBURN.—Our citizens have already witnessed the completion of many permanent improvements during the present year. We started last March and have been appropriating money steadily since then for water-works, roads, sewers and drains. We have already appropriated \$211,000 for water-main replacements and extension, \$100,000 for highways, and \$10,000 for sewers and drains. At last night's meeting of our City Council additional relief loan orders amounting to \$35,000 were passed.

MIDDLESEX COUNTY COMMISSIONERS.—In reply to your letter of the 17th inst., as to the unemployment situation in this Commonwealth, the Middlesex County Commissioners have recently concluded a contract for the erection of a district court building in the city of Malden involving an expenditure of \$140,000. There is an appropriation of \$250,000 on account of highways available for county work, and all this money has been appropriated for definite projects, largely in connection with state aid work in towns.

* See THE AMERICAN CITY, October issue, page 294.

To set a great army of one million men at building highways, sewers, water-works, etc., would release money for local circulation through wages to local labor and in payments to local producers and contractors. Stimulation in the production of trucks, machinery and raw materials and in engineering and the employment of labor can positively be accomplished with such a program.

Engineering in Relation to Fire Alarm Telegraph and Police Signaling Work

By A. L. Tinker

THE life and prosperity of a community are largely dependent upon the efficiency of its fire and police departments. Probably no other municipal departments touch so closely the daily lives of the citizens. In supplementing the activities of these departments, by providing proper and adequate signaling systems in order that their equipments and personnel may be more quickly brought into service in time of need, fire alarm telegraph systems and police signaling systems are installed. It can be truly said that these two systems are of the highest emergency character. They must not only produce the result for which they were designed and built, but they must produce that result dependably, and under all the varying conditions of use.

Special Knowledge of Actual Service Conditions

So far as the apparatus itself is concerned, here enters the necessity for a character of engineering having special knowledge of what actual field service is. Fire alarm and police boxes are ordinarily placed out on the streets, and fire alarm boxes particularly are used by persons having no knowledge whatever of their construction or operation—and are used under the stress of excitement. The effects of heat and cold, of dryness and dampness, of dust and dirt, of excited operation and manipulation, are but a few of the service factors that sound engineering must take into consideration in designing and constructing apparatus of this kind.

Given two engineers of equal technical ability, backed by manufacturing organizations of equal equipment, with one engineer having special knowledge of all service conditions which have existed from the beginning of the art of fire alarm and emergency signaling up to the present time, and the other not having such special knowledge, it is a self-evident fact that the one would produce dependable apparatus, while the other would not. The "special knowledge" engineer must not only determine the

design of the apparatus, with all service conditions before him, but the material to be used, and how it shall be machined and finished. This part must be made more rugged than theoretical engineering would indicate, because field experience shows certain things: that bearing must be adjusted one way if the apparatus is to be used in the Northwest, and in a different way if it is to be used in the extreme South. And so on, down the line, as special knowledge has been gained through observation of actual service conditions and careful engineering study of them.

Every Link in the System Should Be Dependable

The same would be true of the design and construction of central station equipment; of switchboards and police desks; of protector devices; of battery and its charging control equipment; of alarm and recording apparatus in engine houses; and of flashlight and other signaling apparatus for police departments. Overhead wire construction, underground cable construction, interior wiring installations, must all be subject to the same special knowledge engineering if the greatest possible results over the longest possible time are to be realized. It is futile, in the larger sense, to have dependable street apparatus properly engineered and a circuit system which is not so engineered. It is an old saying that a "chain is no stronger than its weakest link," and surely, where human life and property are at stake, special knowledge engineering should be present in every part of every system or service designed for its protection.

The efficient fire and police department is organized carefully along special knowledge lines; in other words, such organizations are engineered. Fire department and police department officers are the product of special knowledge and study—the recipients of the combined experiences of all fire department and police department officials, not only in this country but in others. Training

schools are established for the rank and file in order that they may receive the benefit of special knowledge pertaining to their duties and responsibilities. Fire-extinguishing apparatus, high-pressure pumping stations and services, police equipment of all kinds, are the result of special knowledge and high-class engineering based thereon.

Does it not logically follow that these carefully engineered structures should be reared on the solid foundation of signal engineering of the highest order? Unless they are so reared, the full value of their special engineering cannot be realized, for the two vital factors, dependability and speed, cannot be assured. Without dependability and speed, without the vital things that special knowledge engineering alone can give in emergency signaling, a fire or police department cannot operate to yield its maximum possibilities.

Other Engineering Factors

There are other engineering factors that have a decided relation to fire and police telegraph systems, besides the special knowledge engineering entering into the design and construction of apparatus, equipment and circuiting. One of these other factors is that of purchase—the engineering of money expenditure along lines of special knowledge as to what results are imperative to secure, and how they can be most fully secured. Just as the special knowledge engineer, in designing and building apparatus after full knowledge and careful study of service conditions, uses a character of material much more “expensive” than some other because he knows that it is more reliable and dependable; just as he follows an expensive manufacturing process because he knows that a different one is unsafe; so should the purchasing engineer appre-

ciate that there is a very wide margin between economy and safety, and that a single failure of one piece of apparatus to function properly may at any time cause a serious loss of life and property.

After the construction engineer and the purchasing engineer have coördinated their efforts and secured the establishment of a protective emergency system in a community, that protective system will not be fully engineered until it is placed in the hands of another engineer charged with the duty of maintaining it and operating it. Such an operating engineer should, of necessity, be imbued with the seriousness of the responsibility upon him, equipped for carrying it, and properly compensated therefor.

In between the special knowledge engineer who constructs the apparatus and installs it, and the purchasing engineer who buys it, comes the sales engineer, who may be a representative of the construction engineer, or a representative of the purchaser, and charged with the duty of recommending the extent of a new equipment, or of an addition to an old one. Engineering in this direction may harmonize an initial installation with the amount of money available for its purchase, and so engineer it that it will be capable of expansion from time to time with but little change and at a comparatively small expense, until the ultimate amount of protection is attained.

Engineering in relation to fire alarm and police signaling work must be continuous from construction to planning, from planning to purchase, from purchase to installation, and from installation to operation and maintenance. If these factors are properly brought together, the result is bound to be an emergency signaling system giving the maximum of protection, at the lowest eventual cost.

The Efficient City is the “City Beautiful”

There has been a wrong impression that city planning is nothing more or less than the embellishment and beautification of the city, whereas, as a matter of fact, it is the lopping off of the unnecessary things; it is the cutting down to the practical things that makes your city efficient, that makes it responsive to every call that is put upon it; and out of that order, out of that very rhythm of movement, out of the ability to do the things placed upon it, will come the “City Beautiful.”

—J. C. Nichols, from a paper read before the Twenty-fourth Annual Convention of the National Association of Real Estate Boards.

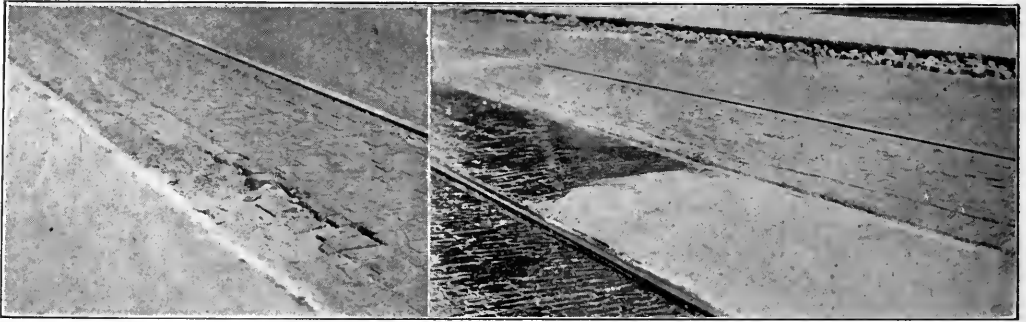
Paving Between Street Car Tracks in Dubuque

Sand Cushion Eliminated and Old Brick Used in Rebuilding Paving—Work Done by Contract and Paid for by Special Assessments

IN 1917 a creosoted wood block paving was laid on Couler Avenue in Dubuque. This street has double track and was formerly paved with brick. The company protested to the city authorities against the use of wood block for track work, but to no avail. Considerable trouble developed with the creosoted blocks, especially between rails. The block swelled with moisture and heaved, and in this condition were torn out

work and removing the old paving previous to the starting of work by the contractor.

The track where this type of paving was used is laid with standard 72-pound T-rail 6 inches in height. As the old brick measured $3\frac{1}{2}$ inches in height, it was necessary, since the old 2-inch sand cushion was eliminated, to concrete up to $3\frac{1}{2}$ inches below the finished surface of the street. This was done with a 1-6 gravel concrete.



BEFORE AND AFTER REPAIRING IN DUBUQUE, IOWA

At left—The reason for repairing. At right—Finished paving with sand coating between tracks. Brick paving with coating of paving filler in foreground

or were disturbed by cars passing over them. Conditions on this street were so bad that it became necessary to replace the paving. Superintendent A. H. Smith of the street railway company advanced the idea that the sand cushion should be eliminated for the paving between rails and also advocated that old paving brick $2\frac{1}{4} \times 3\frac{1}{2} \times 7\frac{1}{2}$ inches be used by turning up the unworn face, setting them in a gravel concrete and filling and covering with bitumin. The city approved the change and coöperated in carrying it out.

Paid for by Special Assessments

In order to ease the burden on the street railway, the work was undertaken by the city and done under special assessments which gave the street railway seven years to pay for it. The work was contracted for, the street railway taking care of its track

Broken Brick Utilized

A novel method of providing the flangeway was devised. The height of the old brick allowed it to be placed in a bed of concrete against the web and under the ball of the rail. Broken brick or "bats" were utilized for this purpose, a flangeway $1\frac{1}{4}$ to $1\frac{1}{2}$ inches width thus being provided. The depth of the flangeway was approximately the depth of the ball of the rail, or about 1 inch. The proper crown was provided in the paving between rails. Between tracks the brick was laid in concrete, the top of the bricks being flush with the top of the rail. The creosoted block paving outside the tracks was not disturbed, its surface being flush with the top of the rail.

After the brick had been laid, the paving was flushed with Stanolind paving filler. This was applied by pouring and brushing into the space between bricks. The first ap-



VIEW OF NOVEL TYPE OF PAVING BEFORE COATING OF PAVING FILLER AND SAND WAS APPLIED

Note the method of providing flangeway and the absence of the usual sand cushion for the brick

plication of this was heavy, but it was found necessary to go over the surface a second time to fill the larger crevices. This application completely water-proofed the paving and filled in around the flangeway stretcher brick, practically eliminating the possibility of water's getting under the wearing surface.

As a final application, a good covering of pit sand was used, making a smooth and very desirable top surface, as shown in one of the illustrations.

In addition to providing a serviceable and excellent paving, this method is of unusual interest because of the large saving accomplished in utilizing the unused surface of the old paving brick. The remaining features are the elimination of the so-called essential sand cushion, and the method of paying by means of special assessments arranged for by the municipality.

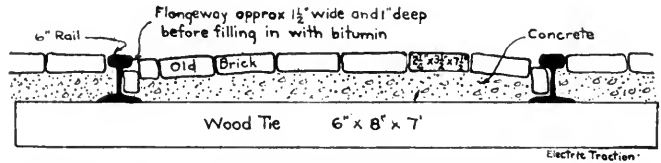
The Cost of Paving

By utilizing the old brick in the paving

on Coulter Avenue and eliminating the sand cushion, it is believed that a paving has been constructed that will render exceptional service and remain smooth. In view of this unusual feature and its extremely low cost, \$1.80 per square yard, it is believed that this type of paving is unique in the street railway field.

The Dubuque Electric Company also accomplished a big saving in the recent paving of one of

the main business streets. The track on this street had been built for seventeen years, and the ties and foundations were found to be in exceptionally good condition for track of this age. It was decided, therefore, that the ties and foundation should be retained. The track was accordingly lined and surfaced and equipped with tie rods and Coover rail braces. The joints were welded with an Indianapolis welder, and the permanent paving of 2-inch bitulithic dressing on 4-inch concrete with



CROSS-SECTION OF PAVING BETWEEN STREET CAR TRACKS IN DUBUQUE

brick 12 inches on each side of rail was then placed. It is estimated that ten years' additional service may be gotten out of the track by this means.

ACKNOWLEDGMENT.—Text and illustrations by courtesy of *Electric Traction*, Chicago, Ill.

The Growth of Street Paving in Akron, Ohio

Akron street pavements have been almost doubled during the past ten years. At the present time the city has 144 miles of paved streets. During the past ten years 76.85 miles were paved. A large amount of paving is being done this year, together with more than six miles of resurfacing. The paving record for the past ten years is as follows: 1911, 8.91 miles; 1912, 12.08; 1913, 15.75; 1914, 12.02; 1915, 5.03; 1916, 0; 1917, 5.94; 1918, 5.45; 1919, 6.12, and 1920, 5.55.

—Akron Chamber of Commerce *Bulletin*.

Street Lighting in Stamford, Connecticut

Installation Recently Completed Said to Be One of the Best Ornamental Systems in the East

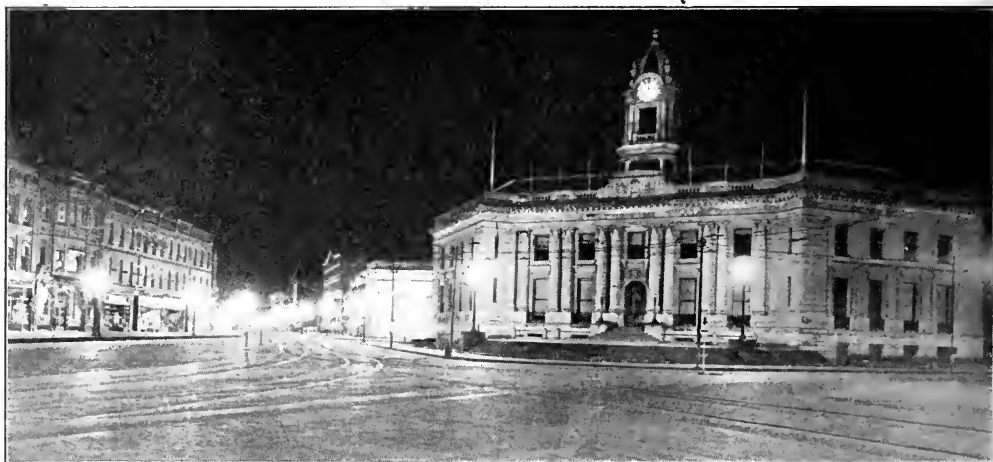
By W. D. Jennings

THERE has recently been placed in operation in Stamford, Conn., what is probably one of the best and most artistic ornamental street lighting systems in the East.

Stamford is one of the most attractive and progressive cities of Connecticut, with a population of 40,000. It is ideally situated

street showed lighting intensities of 0.27 foot-candles.

There were installed in the business, and part of the residential, section, 134 direct-current, 6.6-ampere series pendent luminous arc lamps of the Boston type, equipped with opal globes and mounted two on a pole in the business section, singly in the secondary



STREET LIGHTING WITH ORNAMENTAL LUMINOUS ARC LAMPS NEAR THE TOWN HALL, STAMFORD, CONN.

on Long Island Sound, and within easy commuting distance, only thirty miles, from New York City; consequently, it is primarily a city of homes, although it numbers among its various industrial activities some of the largest manufacturing plants of their kind in the country.

The use of luminous arc lamps for ornamental street lighting is well established, and they continue to hold the field where high intensities and low maintenance costs are considered; there are, however, several interesting features regarding this installation which merit recording.

The Original Lighting System

The previous lighting equipment in Stamford was in no sense obsolete, and, as a matter of fact, on the principal business

business district. The lamps were on one side of the street only. The price paid per lamp per year was \$90 for overhead construction, \$120 underground, for 4,000 lighting hours; 80 of these pendent type lamps will be retained in service in the outskirts of the new lighting zone.

New Lights and Standards

The new equipment consists of 150 General Electric direct-current, 6.6-ampere series ornamental luminous arc lamps, equipped with 8-panel alabaster globes of pleasing design. The lamps are placed on top of ornamental posts, with a mounting of 14 feet 6 inches to the light source.

The standards are located approximately 100 feet apart, on each side of the street, with staggered arrangement, and are oper-

ated from two circuits, so that lamps on alternate sides of the street can be extinguished after midnight, with the exception of lamps adjacent to the Town Hall, which burn all night. Each lamp has a series absolute plug cutout installed in the base of the ornamental pole, and when the plug is removed all connection between lamp and line is absolutely opened.

For convenience in trimming, a 750-pound electric truck was converted into a tower-wagon. This has been found almost indispensable when changing arc lamps or cleaning the globes, and in addition is used for renewing burned-out series incandescent lamps.

This new system represents the latest improvements in design of arc lamps for street lighting service. In their essential principle these lamps are the same as the older forms of pendent and ornamental luminous arc lamps, although a number of detail changes have been made in order to provide better electrical insulation and make the lamp easier to maintain and more reliable in service. The calculated illumination value on street surface along center line of street is an average of 0.35 foot-candles.

In addition to the general pleasing effect produced by the soft whiteness of the light from the luminous arc, it seems to afford better vision along the street than the yellow tones of light. Particularly is this

noticeable as contrasted with the ordinary yellowish light in store windows. Instead of reducing the apparent brilliancy of the window, the difference in color serves to introduce a contrast that accentuates both the street illumination and the window display.

The price per lamp per year is \$120 for about 3,000 lighting hours, the contract period covering ten years from the date of installation.

In addition to the ornamental lighting, the series incandescent system was improved by replacing about 931 60-candle-power, 6.6-ampere Mazda B series lamps, furnished at \$20 per lamp per year for 4,000 lighting hours, with 960 100-candle-power, 6.6-ampere Mazda C series lamps at \$25 per lamp per year underground for 4,000 lighting hours.

Not the least important part of any ornamental system is the matter of installation, which in most cases is supplied by underground service, and there is always the fear that the street pavement will be torn up and left in bad condition; however, by the use of hand-steel-armored cables, this trouble is entirely eliminated.

Installation Problem Solved

Without the slightest annoyance or inconvenience to traffic, there were placed underground 9,000 feet of No. 6 stranded, 10/32-inch varnished cambric, 1/8-inch lead,



AN ORNAMENTAL LUMINOUS ARC LAMP,
STAMFORD, CONN.

.003 band-steel-armored cable, and 8,000 feet No. 6 2-conductor, flat, 5/32-inch varnished cambric, 1/8-inch lead, .004 band-steel-armored cable. For connecting the old underground cables with the new ones, single duplex-conductor, varnished cambric cable, 10/32-inch and 5/32-inch, respectively, 1/8-inch lead was used.

The armored cable was laid close to the street side of the curb, and the trench was prepared by the use of a specially designed gasoline engine compressor, mounted on a truck body for portability; the compressor was of sufficient capacity to operate 6 "guns." After the desired length of trench was opened, the cable was laid in, covered with wooden strips, and concrete, which was prepared by a power-driven mixer, was poured flush with the vitrified brick street surface.

The Stamford Gas and Electric Company assumed the entire cost of equipment and

its installation. The new street lighting contract for all lighting will cost the city \$47,575, as against the previous expenditure of \$30,680 yearly.

There is a decided tendency on the part of city officials to pay more attention to street lighting equipment, not only as a matter of civic pride, but also because well-lighted streets have a definite bearing toward decreasing traffic accidents, and when the matter of improved lighting is properly placed before the various business men's associations there is seldom any protest against the additional expense incurred.

The luminous arc lamps, cut-outs, cables and mercury arc rectifier equipment were furnished by the General Electric Company, Schenectady, N. Y., and the ornamental poles by the Union Metal Manufacturing Company, Canton, Ohio. The installation work was done by the Central Station Equipment Company, New York.

Laying Water-Mains Overhead

Temporary Crossing of the Cayuga and Seneca Canal with Cast Iron Water-Mains by Unique Method


THE need for temporary crossing of the Cayuga and Seneca Canal by the water-mains of the Waterloo Water Company, Waterloo, N. Y., brought out a problem of rather unusual interest, and furnished possibly the first instance of the transmission of water or of the laying of water-mains by an overhead or aerial method. The company used this method several years ago and plans to repeat the use of the method in the near future for another crossing.

The need for the temporary crossing arose suddenly, permitting of no time for a rigid temporary structure. Because of the ease of construction, therefore, and with an eye to the small expense involved, as all of the necessary material was available from the junk-pile of a neighboring contractor, crossing by means of a suspended cable was determined upon as the most expedient method. A 1-inch cable about 400 feet long, anchored to dead men at both ends, was elevated by towers placed about 100 feet from each anchorage to a height of about 25 feet, thus permitting about 200 feet in suspension, which was the clearance required. The

towers were but ordinary discarded telephone poles, sunk and guyed.

The 6-foot lengths of Universal cast iron pipe were carried by boat from the shore of the canal to the cable, starting at the middle or lowest point of the cable and fastened by heavy wires to it, to wire supports to the first length of pipe and one to each succeeding. The wires were then clamped to the cable. Adjoining lengths of pipes were then brought out, bolted to the other lengths and made fast to the cable in the same manner. When the entire length had been spanned, an hour or two sufficed to take out the accumulated slack in the cable, by turn-buckles at either anchorage, and to remove the irregularities and unevenness in the line of pipe. This was done by taking up the wire supports at one point and letting them down at another. Upon completion, the pipe line ran a remarkably smooth, straight course from one bank of the canal to the other, and after the preliminary try-out required no attention while it continued in use. There is considerable doubt whether such a crossing could have been effected by the ordinary bell-and-spigot cast iron pipe.

Red Cross Membership—A Civic Duty



I am the Red Cross
of Peace —
I heal the wounds
of war —
I am a refuge from
fire, flood and
pestilence —
The love of little
children is mine —
I am the Red Cross
of Peace —

American Red Cross

“In the service of those who suffer”

FIFTH ANNUAL ROLL CALL, NOVEMBER 11-24

If your city suffered a disaster during the past year, you will need no reminder of the prompt and effective service of the Red Cross. But it is not only in times of spectacular calamity that the Red Cross is on duty. Its health centers, classes of instruction, and health nurses are always at the service of the community

Municipalities Appreciate Machines



SOUTH BEND FLUSHER MOUNTED ON A GRAMM-BERNSTEIN 5-TON CHASSIS

This outfit is also equipped with sprinkler nozzles mounted just below and in front of the headlights. By sprinkling the pavement before flushing, the efficiency of the flusher is increased 50 per cent



A PART OF THE MOTOR-CYCLE SQUAD OF MILWAUKEE, WIS., POLICE MOUNTED ON HARLEY-DAVIDSON MACHINES



A KOEHRING 14E PAVER EQUIPPED WITH GOODYEAR SOLID RUBBER TIRES, AT WORK IN BROOKLYN, N. Y., DOING PATCH WORK FOR THE CONSOLIDATED ASPHALT PAVING COMPANY



THE MODERN FIRE-FIGHTING EQUIPMENT OF WICHITA FALLS, TEXAS

1. Stutz combination hose and high-pressure turret nozzle with 1,200 feet of hose, purchased June, 1920.
2. Stutz combination chemical and hose wagon with 1,200 feet of hose, purchased June, 1920.
3. American-La France hook and ladder truck, purchased February, 1916.
4. Dodge car for Fire Marshal, equipped with two 40-gallon chemical tanks and two 3-gallon chemical extinguishers, purchased December, 1918.
5. Seagrave 850-gallon pumper with 1,200 feet of hose, purchased December, 1915.
6. Stutz 750-gallon pumper with 1,500 feet of hose, purchased June, 1920.
7. White triple hose, pumper and chemical truck, purchased February, 1919.

Chamber of ******* Commerce Activities in Public Affairs

Commercial Club Dedicates Road It Had Promoted

BILLINGS, MONT.—The accompanying photograph was taken at the official dedication of the Polytechnic Road, near Billings. This road is the second piece of concrete highway constructed in the state of Montana outside city limits, the other being the construction between Anaconda and Deer lodge.

The financial campaign to make this road possible was undertaken by the Commercial Club, which circulated the petitions among the property owners along the highway, who paid their portion of the costs. The Club also placed before the Federal Government the importance of this road, as it leads from the city to the Polytechnic Institute, an institution which serves a large number of men and women gathered from a wide area. The Commercial Club also assumed charge of the

program for the official dedication of this highway, and the fact that the Montana State Teachers' Association was in annual convention in the city at that time made it possible for a large attendance of outside visitors.

This project runs from the city limits of Billings in a northwesterly direction for a distance of 2 miles and is built of one-course Portland cement concrete, 18 feet wide, 8 inches thick in the center, and 6 inches on the sides, at a cost of \$86,899.42.

The composition of the concrete was one part cement, two parts sand, three parts coarse aggregate. In the absence of suitable sand, it was necessary to make the fine aggregate by crushing rock with sand rolls. Owing to seepage from the B. L. & I. ditch, it was found necessary to build a rock drain, 2 feet wide and 3 feet deep, under the center of the pavement for a distance of 700 feet from the beginning of the project



160 CARS WERE IN LINE WHEN THE BILLINGS, MONT., COMMERCIAL CLUB DEDICATED THE POLYTECHNIC HIGHWAY

at the city limits. The pavement on this portion of the work was reinforced to prevent cracking.

The reserve curve on this project was banked at the rate of $\frac{3}{4}$ -inch per foot, and the pavement was widened 3 feet at the center of each curve. The photograph shows the line of automobiles extending from the new St. Vincent's Hospital in the background to a point half-way between the city limits and the Polytechnic Institute. Approximately 160 cars were in line, among the occupants of which were delegates to the State Teachers' Association Convention.

FRED T. LINCOLN,
Secretary, Billings Commercial Club.

Winter Sports a Great Success

PLATTSBURGH, N. Y.—For a number of years the Plattsburgh Chamber of Commerce has had among its regular committees one known as the Committee on Sports and Festivals. In the fall of 1920, however, on account of the growing demand for organized winter sports in Plattsburgh, the Board of Directors of the Chamber authorized the appointment of a special committee on winter sports. This committee was given full power to launch a campaign for the formation of a Winter Sports Association and was instructed first to gather complete and detailed reports.

The Chairman of the Winter Sports Committee, a member of the Board of Directors of the Chamber, met with the Common Council (or Board of Aldermen) and

was assured of the Board's hearty coöperation, particularly in the matter of furnishing water and a line of pipe to the proposed rink. The Fire Department also offered coöperation in the use of the fire engine pump for flooding the rink when occasion required. It might be said in passing that the Fire Department rendered good service later on in the winter when on a zero night the fire engine pumped thousands of gallons of water into the basin of the rink, previously prepared for such flooding.

Most important and most valuable co-operation came through the Board of Education, which, having the assurance that the Chamber of Commerce was back of the entire project, granted to the proposed Winter Sports Association the use of the High School athletic field and playground, immediately at the rear of the High School, and at the foot of a semi-circular hill or embankment about 40 feet high.

The subcommittee on rules and regulations then drew up the following schedule:

General admission, 15 cents. Checking, 5 cents.

General admission applies to every day of the week, including evenings and Sundays, but does not apply to certain special attractions offered from time to time. Special rates for school children.

Membership tickets (\$10 each) are good for the season of 1920-21. (Membership tickets do not include 5 cents for checking.)

The above four groups of admissions include the use of both the rink and the toboggan slide, subject to rules and regulations provided by the Association.

After fully a month of painstaking preparation and with the distinct understanding that not one cent would be expended until a guaranteed membership of 200 at \$10 each

had been obtained, a public meeting was called, and at this meeting the entire project was submitted for approval or disapproval. About 150 enthusiasts for winter sports were present at this meeting, and the plan as proposed by the Chamber of Commerce committee was unanimously approved. The meeting then elected a Board of Directors of the Winter Sports Association, which was given power to elect its own President, Vice-President, Secretary and Treasurer.



A RACE ON THE PLATTSBURGH RINK

Note the amplifiers which supplied music from a phonograph in the building

IT PAYS THE CITY OF RICHMOND

DR. R. L. HAMILTON
DRUG STORE
CITY OFFICE 24
RESIDENCE 24

HAMILTON DRUG CO.
PHONE 36
RICHMOND, MISSOURI

HARRY E. SPENCER
REGISTERED PHARMACEUT
RESIDENCE PHONE 147

8/12/21

B & R Electric Co.,
Kansas City, Mo.

Gentlemen:-

As Chairman of the "White Way" Committee, Richmond Chamber of Commerce, Richmond, Mo., I wish to state that the lighting system recently installed here by you, is absolutely the last word in modern street lighting. The King Standard, equipped with General Electric Novalux Units, gave an elegant appearance by day, and a beautiful lighting effect by night, and the cost of operation is much less with this system than with other systems.

Since becoming interested in the better lighting of our streets, I have visited a number of cities boasting "White Ways." Some of these systems were the two, three and five cluster lights, and I must say that the single Unit Novalux Globe diffuses the light much better than any globe I have seen. A newspaper can readily be read at the darkest points on our streets.

The King Standard combines the features of strength and beauty, and have many decided advantages over other standards on the market.

Altogether, our citizens are highly pleased with our "White Way" and I cheerfully recommend the B & R Electric Co., as being a firm who have done more and better than they contracted to do.

Respectfully,

H. E. Spencer
Chairman "White Way" Committee
Richmond Chamber Commerce,
Richmond, Mo.



KING MFG. CO.

53 W. Jackson Blvd., Chicago, Ill.

At the close of the public meeting above referred to, 120 memberships were signed, and after a two weeks' canvass a total membership of 218 was obtained, each membership at \$10.

Work was at once begun on the rink. Eight 250-kw. electric lights about the rink, four 500-kw. electric lights over the rink, and three 500-kw. electric lights along the toboggan slide and chute were installed, and a toboggan slide, 45 feet in height, was erected.

The success of the project exceeded all expectations. Here are a few figures taken from the summary of the financial report made by the Secretary in March, 1921:

TOTALS FOR 38 SKATING DAYS, SEASON 1920-1921

General paid admissions.....	6,621
Children, paid admissions.....	1,756
Total paid admissions.....	8,377
Estimated total membership tickets used during season.....	1,900
Estimated school children using rink free.....	4,800
Paid admissions to New York State Championship Races, February 14, 1921.....	*3,000
Admissions to rink, conservative total.....	18,077
Cash balance, September 1, 1921, to be carried over to season of 1921-1922, all expenses paid	*\$300

* Over.

During the season of 1920-1921, the Plattsburgh community rink had its music furnished by electric amplifier megaphones, fourteen of which were suspended over the skating track and the hockey pen. In the dressing-room was an ordinary phonograph attached to an electric amplifier device supplied with about 300 volts. The sound at the point of the phonograph needle was multiplied about 3,000 times, and this was carried over distributing wires to the recreation field. It made no difference what the weather was—if there was skating, there was music. The amplifiers eliminated the cost of bands or orchestras. Ordinary phonograph records were used. All announcements were made over the amplifiers, and at the State Championship races the

entries and winners were announced in this way.

FRANK M. MOORE,
Secretary, Plattsburgh Chamber of Commerce, Inc.

A Municipal Hospital—The Gift of a Private Citizen

WHITTIER, CALIF.—This city of 10,000 population claims to have one of the most up-to-date and attractive hospitals of any city of its size in the United States. The institution is rather unique in view of the fact that although it is a municipal hospital its existence is due to the philanthropic spirit of a man not a resident, but a true citizen and whole-hearted friend of the community.

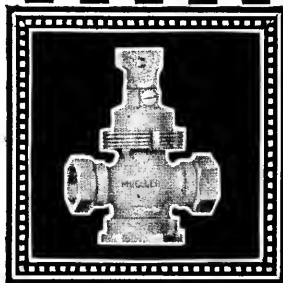
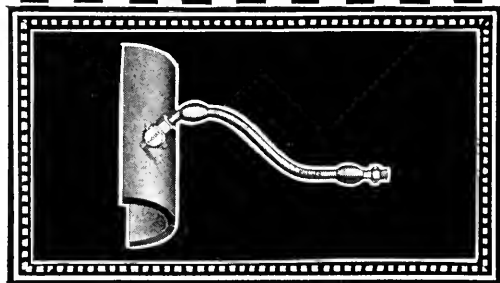
Thirty-four years ago, when Whittier was established as a little Quaker settlement and the planting of citrus and walnut orchards began, water was the great need for its development. One of the men who supplied this need, making a flourishing citrus district out of the desert soil, was Colonel Simon J. Murphy. Later some of Colonel Murphy's lands were proved to be pools of extraordinary wealth in the form of oil.

Accordingly, Colonel Simon J. Murphy, Jr., has erected on a site dedicated to its use by the city a beautiful and dignified structure as a memorial to his father. Colonel Murphy was willing to equip the hospital, but several who had been closely associated with him in planning the enterprise believed it would be wiser to permit the community to have a share in the ownership of the institution. Accordingly, there was prepared a list of the equipment necessary for each room and each department of the hospital. This was placed in the hands of the Chamber of Commerce, which conveyed to the community the information that from a chart one might select the room which one desired to equip. The invitation was open to lodges, church societies and individuals. The response

was immediate, whole-hearted and enthusiastic. Church societies furnished large wards. Lodges equipped rooms which they will always consider as having a special interest for their members when the need comes. The Woman's



THE UP-TO-DATE HOSPITAL OF WHITTIER, CALIF., IS A CHALLENGE TO OTHER CITIES OF 10,000



Reliable Service

Public Service Companies require equipment that will give reliable service continuously.

For over fifty years the great **MUELLER** Factories have supplied the Public Service Companies of the leading American and Canadian cities with dependable

MUELLER Brass Water Works Goods

such as **MUELLER** Goose Necks E-501, **MUELLER** Ground Key Curb Cocks E-557 and **MUELLER** Extension Service Boxes E-751, here illustrated—and many others.

It pays to install **MUELLER** goods for reliable service. Mail orders given prompt attention.

H. Mueller Mfg. Co., Decatur, Illinois

PHONE BELL 153

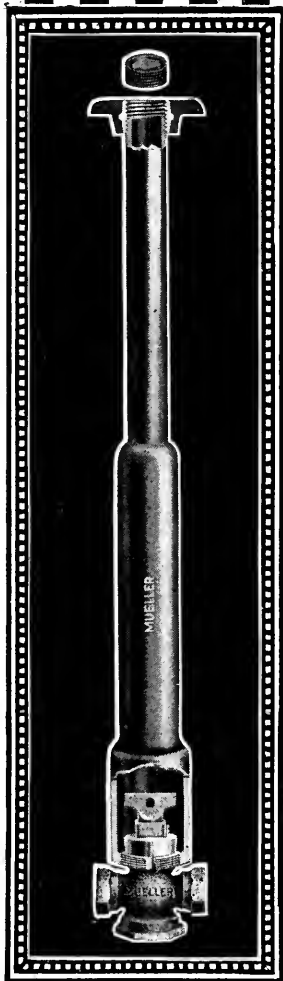
Water, Plumbing and Gas
Brass Goods and Tools

New York City,
145 W. 39th St.
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San Francisco,
635 Mission St.
Phone Sutter 3577

Sarnia, Ontario, Canada

Mueller Metals Co., Port Huron, Mich., Makers of "Red Tip" Brass Rod; Brass and Copper Tubing; Forgings and Castings in Brass, Bronze and Aluminum; Die Castings in White Metal and Aluminum; also Screw Machined Products.



Club of Whittier made itself responsible for the maternity departments, and the medical fraternity equipped an operating room with the most perfect equipment known to medical science.

After that there was need for a substantial sum to provide for the opening of the institution and for its maintenance during an early indefinite period. The Chamber of Commerce was called upon, and its committee conferred with one citizen, who provided \$25,000 as a maintenance fund, the sum to be later reestablished out of the income of the hospital to be the foundation of an endowment fund which should assist in the care of needy patients.

Then came the question of management. Knowing the frequent financial deficits faced by hospitals and believing that such an institution should be free of the embarrassing necessity of maintaining itself by private subscriptions or of charging exorbitant rates, the Chamber of Commerce went before the State Legislature and secured the enactment of a law providing that California cities of the fifth and sixth classes should be permitted to accept the gift of any individual for the establishment of a hospital and should further be empowered to levy any necessary taxation to provide for the maintenance, up-keep or extension of such a municipal institution when established. Such a law was signed by the Governor on May 29 and is effective from September 1. A Board of Managers was appointed by the Mayor, and the institution was turned over to the city by Colonel Murphy and dedicated the 29th of April, 1921.

M. J. HAIG,
Secretary, Whittier Chamber of Commerce.

Shrubs as Prizes for City Beautification

FORT WAYNE, IND.—The Civic and Municipal Bureau of the Chamber of Commerce of Fort Wayne has sponsored a city-wide beautification campaign and "Better Yards Contest," which has brought excellent results.

In this work the Bureau joined with the Fort Wayne Community Service Council, and, following out the general plan of organization perfected in community service work, nine majors were appointed to take command of the nine districts into which the city had been divided. The or-

ganization was further carried out by the appointment of captains, one for each of the subdivisions in each district, and the captains in turn appointed lieutenants to personally supervise the work in their own neighborhood and community groups. In this way the idea of neighborhood beautification was emphasized.

The general organization is headed by J. J. Kline, Chairman, and Henry W. Lepper as Vice-Chairman, with the assistance of Chairman M. S. Mahurin and Vice-Chairman Frank E. Bohn of the Civic Bureau.

Following the division of the city into working areas with definite boundaries, a special committee consisting of Charles J. Steiss, Chairman, also President of the Fort Wayne Community Service Council, and Frank J. Rahe and S. Lee Scoles, was appointed to plan the rules for the contest and plan for the prizes. It was decided to offer 500 shrubs of some unusual type to the winners of the campaign. An expert will plant them, so that they will be given every opportunity to thrive. These shrubs will be selected as a distinct feature, so that wherever they are seen they will be instantly recognized as belonging to one of the prize-winners in Fort Wayne's beautification campaign of 1921. The shrubs will be purchased from funds raised through popular subscription, community service organizations, and the support of men who are interested leaders in this work.

The prizes were awarded in September, and the point system was followed, with ten points each for lawns, well-cut grass, edging sidewalks, flowers, shrubs, trees, hanging baskets and trellises, general appearance of back yard, general appearance of front yard, and general outside appearance of house. Coupons were inserted in the newspapers, which were cooperating in this work, and these were filled out and mailed back to the Civic Bureau at the Chamber of Commerce, which constituted the enrollment of the applicant in the campaign.

CHAS. J. STEISS,
FRANK J. RAHE,
S. L. SCOLES,
Committee on Plan and Prizes.

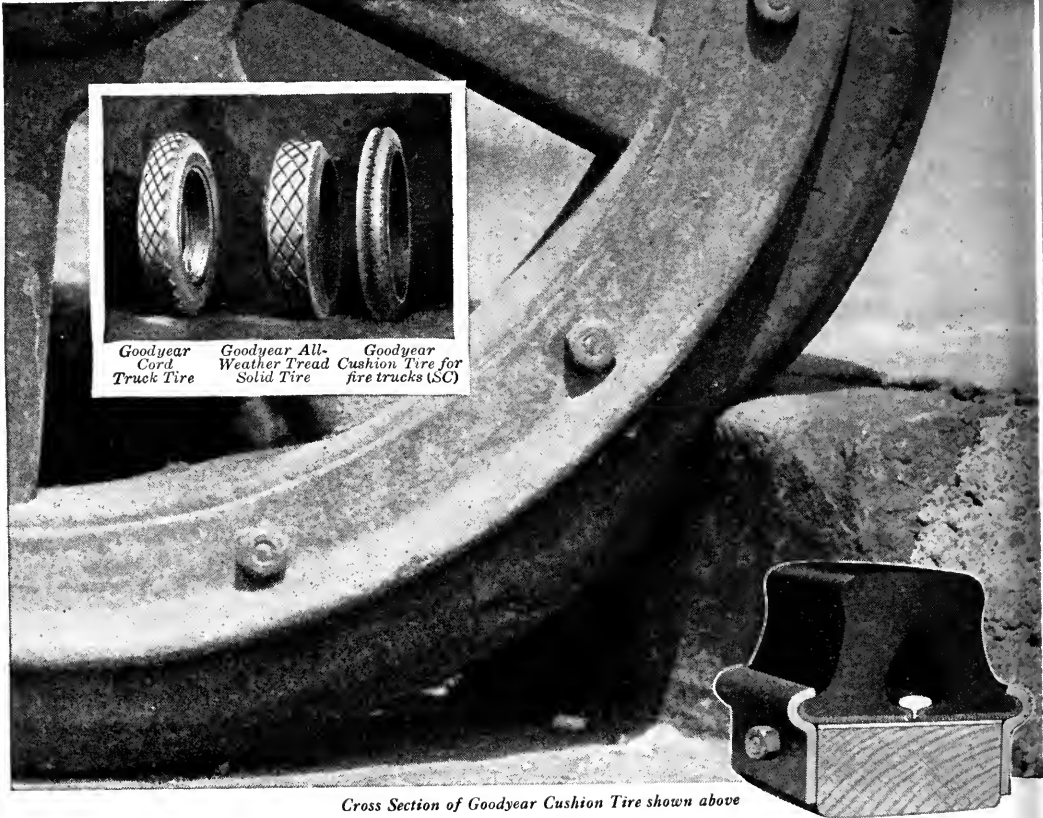
Floating Boat-House Aids River Recreation

FRANKFORT, KY.—Through Frankfort flows a river of which the town has long been proud. More or less boating and swimming has always been enjoyed by the

THE AMERICAN CITY

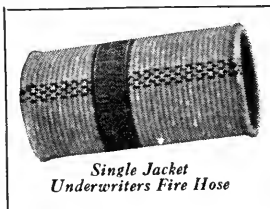
GOODYEAR

Copyright 1921, by The Goodyear Tire & Rubber Co.



Cross Section of Goodyear Cushion Tire shown above

Goodyear Cushion Tires give to medium weight trucks almost as much cushioning and agile ability as do Goodyear Cord Tires. They serve well when used on all four wheels of lighter trucks and on the front wheels of heavy duty trucks. When the going is rough or when the load is heavy, this Goodyear Cushion Tire with its egg-shaped hollow center, flexes easily and protects the truck and its load against damage. Their wearing and high mileage qualities are equally remarkable. For other types of hauling, Goodyear makes other special tires—Goodyear Cord Truck Tires and Goodyear All-Weather Tread Solid Tires.

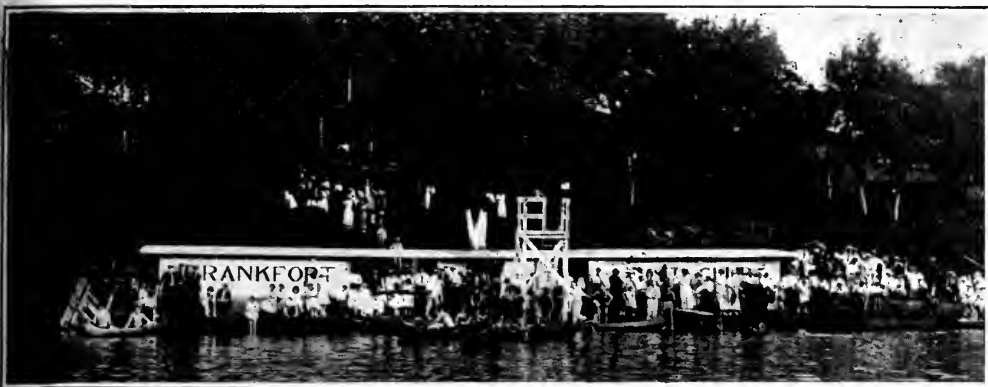


*Single Jacket
Underwriters Fire Hose*

The Underwriters label on Goodyear Single Jacket Fire Hose and Goodyear Monterey Chemical Hose, means that the latter will resist satisfactorily the biting, corrosive action of chemicals and that both will stand a definite pressure per square inch. Goodyear's years of manufacturing experience has enabled the production of hose on a par with all other Goodyear products—hose which will render dependable and economical service.



Monterey Chemical Hose



THE FIRST WATER CARNIVAL AT FRANKFORT, KY., WAS A GREAT SUCCESS

townspeople of Frankfort, but they have never had a proper place in which to keep their boats and canoes, or one from which they could go swimming. Last summer some of the river enthusiasts conceived the idea of having a suitable place where boats and canoes could be kept available for daily use during the summer season.

Accordingly, last winter, several enthusiastic meetings on this subject were held in the Chamber of Commerce rooms. They were well attended by river lovers and resulted in the formation of the Frankfort Boat Club, Inc.

The river at this point is fairly narrow and lies between high banks, which causes high water at irregular intervals, thereby making it impracticable to place a boat-house on the bank. The height of such a house above the river would necessitate too long a runway for canoes, and a windlass would be required to wind them up; in the winter the floor might be overflowed. The idea was worked out of having a floating boat-house, which would always be at a proper height, whether the river was high or low.

Early this spring a coal barge, 90 by 16 feet, capable of holding 90 tons of coal, was purchased. This barge was cut down and extra-braced and thoroughly decked over. A house covering practically the entire deck was raised and divided into four rooms. Two of the rooms, one at either end, are about 25 by 14 feet, and are used as the men's and women's locker rooms. Each contains 26 private lockers. Another room, 20 by 20, was constructed, which will house 12 canoes on racks.

A steward is on board the boat twenty-four hours of the day, so that assistance is

rendered canoe owners in putting in and taking out canoes, and to others in the distribution of towels, extra bathing-suits, and the serving of soft drinks. An ample supply of bathing-suits and towels, also a complete fishing outfit and a rowboat, have been purchased by the club for rent.

The women's locker room has been equipped with four small compartments with curtains, which provide dressing-rooms for the ladies, besides the 26 lockers, which are rented out by the month. A wringer and a water-tank have also been provided for the convenience of guests. The boat-house has been completely equipped with electric lights, which shine out over the water, and this makes possible a great deal of night bathing.

The house is conducted as a municipal swimming- and boat-house in order to meet the need for this kind of summer recreation that Frankfort has so long lacked. The boat is moored at the foot of a residential street and is easily accessible from the center of the town. The water is about 16 feet deep in front of it.

This is a Chamber of Commerce movement entirely, and was made possible through private donations from about sixty citizens, who subscribed amounts from \$100 down to \$5, the President of the Chamber of Commerce taking the lead in subscribing and in securing these subscriptions.

The income derived from the rent of lockers, canoe berths and boat moorings, and from the fee of 10 cents received from swimmers who are not renters, carries the daily running expenses of conducting this enterprise.

L. S. JOHNSON,
Secretary-Manager, The Frankfort Chamber of Commerce.

THE AMERICAN CITY

Half Round Culverts



If you want to be more than 99 per cent sure that the culverts you have installed under your city streets or county highways will last indefinitely, install a NEWPORT CULVERT, made of "GENUINE OPEN HEARTH IRON", guaranteed to be 99.875 percent pure Iron-copper alloy.

NEWPORT CULVERTS are made in both round and half-round types of construction. The half-round type is particularly adapted to city and small town use, while the circular culvert is universally used for county highway work. The advantage of using the half-round culvert lies in its being particularly well adapted where the head room is not sufficient to install the full circle type of pipe, and in the further advantage of being able to clean it readily at any point in the event some obstruction causes the stoppage of same, which is frequently the case in city or small town use.

Send for booklets giving complete data on
NEWPORT CULVERTS of "GENUINE OPEN HEARTH IRON"

NEWPORT CULVERT CO.
542 WEST 10TH STREET NEWPORT, KENTUCKY

Hand versus Mechanical Handling of Coal and Ashes in Municipal Power-Plants*—Part II

By W. F. Schaphorst, M. E.

The Underfeed Stoker

THE illustration below shows a typical multiple-retort, inclined, underfeed stoker. The fuel is forced up from beneath the point where the air is admitted and is then burned on a series of inclined retorts. Distillation of the volatile gases takes place in the retorts, after which these gases, mixed with air, pass up through an active bed of burning coke and then through the incandescent fire zone. Instead of stationary tuyeres, this stoker has moving air supplying grate blocks, carried by the reciprocating sides of the retorts. These retort sides also move the overfeed grates which extend across the entire width of the stoker below the retorts. Beyond these are the rocker dump plates which continuously agitate, crush and discharge the ash. The travel of these reciprocating parts is adjustable so as to control the movement of the fuel bed and the dumping of refuse. This underfeed stoker contains both live

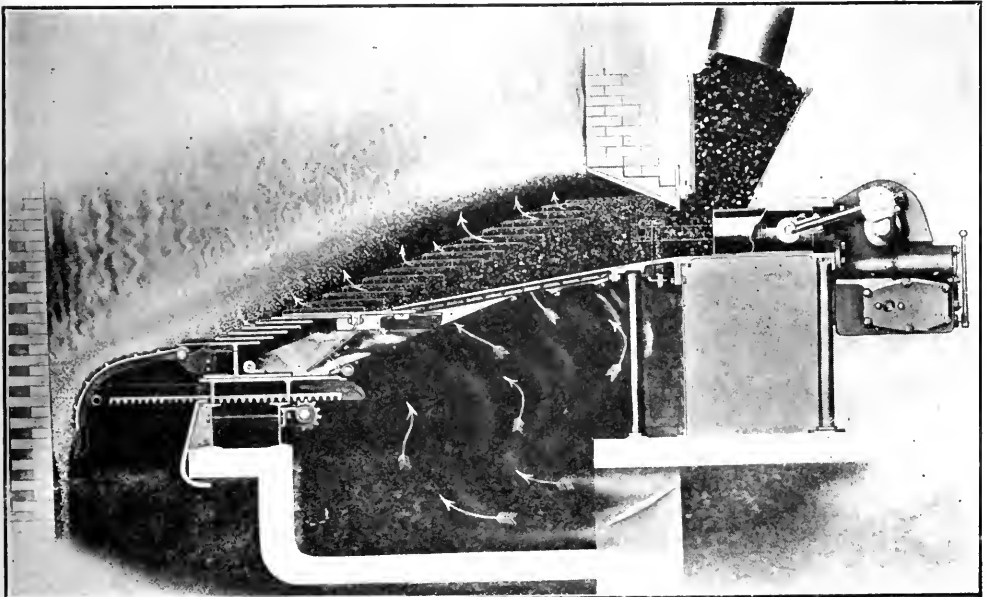
grate surfaces and continuous automatic ash discharge.

The constant movement of the grates, as stated before, keeps the fuel bed in a porous state and gives a uniform air distribution. The air is not choked in its flow, but is allowed to mingle with and thoroughly burn the combustible gases before they can escape. A short, white flame of intense heat is produced—the kind most to be desired for efficient combustion and radiation.

The incline of the retorts and grates is less than the angle of repose—small enough so that the fuel bed does not move except as it is mechanically propelled. There is no sliding due alone to gravity. Raking, leveling and barring are not required to keep the fuel bed even and uniformly thick.

The construction of this stoker is such as to give a combined horizontal and vertical motion to the fuel bed which agitates, crushes and rejects the ash. There is no

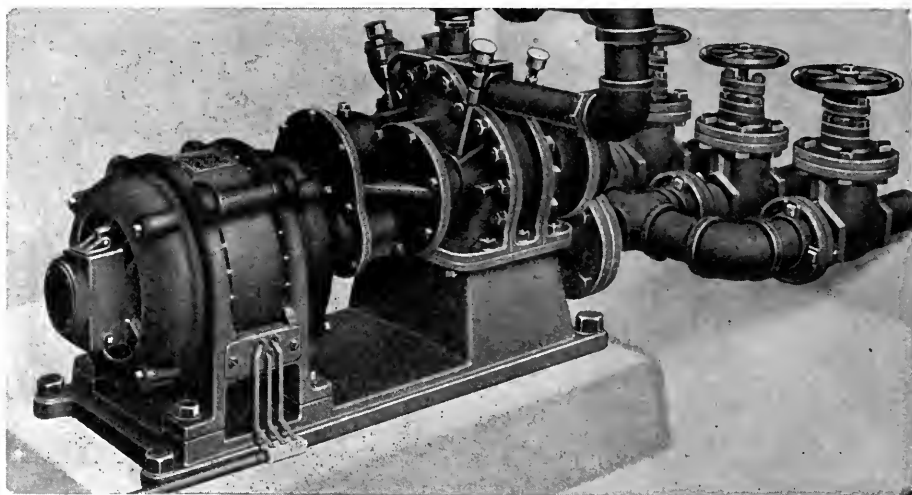
* Copyright, 1921, by W. F. Schaphorst.



Courtesy Sanford-Riley Stoker Company, Worcester, Mass.

A RILEY UNDERFEED AUTOMATIC STOKER

Northern Rotary Pump



This Smooth, Steady, Efficient Pump

**“More Gallons
per
Horsepower”**

—is giving lowest-cost, uninterrupted service in waterworks and fire apparatus units in cities everywhere. (Many departments have standardized on Northern Equipment.)

The Northern Rotary Pump is the acme of simplicity and durability. It has no valves to wear out;—there are no sharp turns or twists to resist a full flow of water;—there are no reversals, pulsations or vibrations to wrack and strain the pumping system.

We Will Give You, without cost to you, complete specifications on the unit that will fit your needs.

Northern Fire Apparatus Co.
2420 University Ave., S. E. Minneapolis, Minn.

periodic or laborious dumping of hot refuse, bringing with it great masses of burning fuel and suffocating gases. This factor assists largely in maintaining smokelessness of combustion.

This is a desirable type of stoker, also, because of convenience of installation. It can be installed under many limiting space conditions. There is but little mechanism to consume space, and no mechanism whatever beneath the cylinders, thus permitting the stoker to be set close to the floor. This gives maximum combustion space under a low-set boiler.

When selecting a stoker it is well to choose a type that can be operated either with natural or mechanical draft. The underfeed stoker can be operated either way. The porous condition of the fuel bed, due to the moving grates, often permits a boiler to be operated above rating on natural draft.

An important feature possessed by the underfeed stoker is that at overloads, when the fuel bed is hottest, and when other stokers give most trouble, due to clinkering, draft being choked off, the underfeed stoker is at its best. With the underfeed stoker the rate of fuel firing is at its maximum; consequently, the fuel bed agitation is greatest, and the result is—the draft loss through the fuel bed is least.

To bank an underfeed fire it is only necessary to shut off all air and then run in enough coal to make a fuel bed as thick as circumstances require. It may be banked equally well for half an hour, a month, or a year. The consumption of fuel is very small—just enough to care for radiation losses.

The underfeed stoker is therefore especially suitable for so-called "stand-by" work, as in conjunction with hydro-electric stations. The stoker can carry a heavily banked fire for months and then almost instantly respond to carry a heavy overload. It has been demonstrated that stokers of this type will raise the boilers from a banked fire to 350 per cent of rating within 7 minutes.

The underfeed stoker will handle poor coal as well as high grade. It is reported by one manufacturer that his stoker has successfully handled anthracite screenings, coke breeze, Mid-Western coal, coking coal, wood refuse and lignite. The important problem with poor coal is to keep clinkers

broken up and rid the furnace of refuse as rapidly as it forms.

Also, now that automatic control is coming more and more into use, it may be well to bear in mind that with the underfeed stoker the air and fuel supply may be controlled automatically.

At high rates of combustion, clinkers will form rapidly in an undisturbed fire. High grade coals do not clinker so readily as low grade, but, because of the intense heat of the furnace, clinkering is very common. These clinkers are liable to give much trouble unless they are continually broken up. The formation of a large clinker means the sealing up of that portion of the fire from air passage, consequently cutting down the coal-burning capacity. This is especially noticeable with coals having a high percentage of ash.

The Hand Stoker

The so-called "hand-stoker," which is hand-fired and hand-manipulated, is an improvement over the old grate and inefficient method of firing. One of these stokers is shown in perspective on page 419. This stoker enables the fireman to put into easy operation the coking method of firing that has proved itself so valuable with mechanical stokers. These stokers are so constructed that they can be installed under any type of boiler without the necessity of any change whatever in the setting or construction of the boiler. It is merely necessary to drill a few holes in the boiler front and depress the ash-pit.

The green coal is placed upon the first few stoker bars only, where it is allowed to coke. The volatile matter distills off and passes over a bed of incandescent coke on the rest of the stoker, thus reducing the amount of smoke to a minimum. The fuel bed is advanced by the movement of the stoker bars, which are easily operated by levers at the side of the fire door. By the movement of the stoker bars the fuel bed is broken up, the fine ash drops through, and clinkers are sheared off at the side walls and forwarded to the rear drop at the bridge wall. It is unnecessary to use the slice bar.

It is claimed that in the hands of an inexperienced fireman a hand stoker can produce results equal to and in many cases greater than that obtained from the much-higher-priced mechanical stokers. For the small municipal power-plant the hand stoker

Tarvia-K P

FOR COLD PATCHING



Patrol gang
patching with
"Tarvia-K P"

Winter Maintenance Saves Spring Repairs—

It's expensive to neglect your roads through the winter—to abandon them to the freezes and thaws that ravel the surface and play havoc with the foundation. As a matter of fact, proper maintenance is even more important in winter than in summer.

Here's an easy, inexpensive method of maintenance that is being used by experienced road officials all over the country:

Before the snow comes—they patch the road surface with "Tarvia-K P." Then, from time to time during the cold weather, they do whatever further patching becomes necessary. (Tarvia-K P can be used whenever the roads are free from snow.) As a result they not only have good roads all winter, but they avoid a

lot of expensive repair work in the spring. "Tarvia-K P" is generally recognized as the most economical, efficient, and convenient-to-use of all road-patching materials. It can be employed on hard roads of every type. It is mixed cold and applied cold. And as the "mix" does not deteriorate with age and is uninjured by freezing, it may be made up in good-sized batches for use as required.

An illustrated booklet giving full directions for repairing different types of roads with "Tarvia-K P" will be sent on request. If you have any troublesome problems in road construction, maintenance or repairs, the Special Service Department will gladly help you solve them. Please address the nearest office.

New York
Cincinnati
Minneapolis
Peoria
Johnstown
Latrobe

Chicago
Pittsburgh
Dallas
Atlanta
Lebanon
Bethlehem

Philadelphia
Detroit
Nashville
Duluth
Youngstown
Elizabeth

The *Barrett* Company

Houston Denver
Montreal Toronto

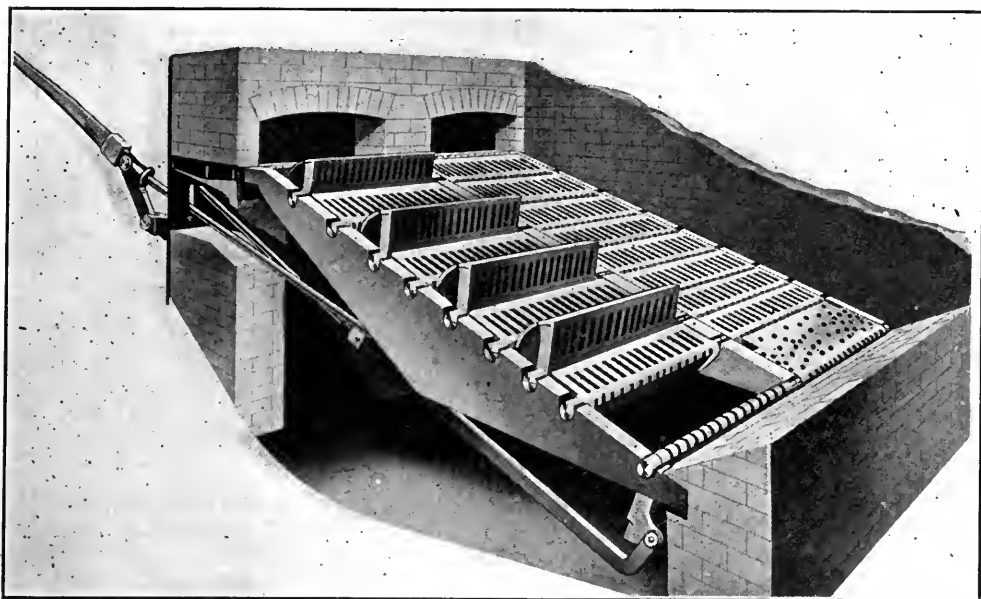
Jacksonville
Winnipeg

Boston
New Orleans
Syracuse
Milwaukee
Toledo
Buffalo

St. Louis
Birmingham
Salt Lake City
Bangor
Columbus
Baltimore
St. John, N. B.

Cleveland
Kansas City
Seattle
Washington
Richmond
Omaha
Halifax, N. S.

THE BARRETT COMPANY, Limited:



Courtesy Flynn & Emrich Company

A HAND STOKER FOR LOW-GRADE FUEL

is particularly desirable. It should never be installed under boilers of greater capacity than 550 boiler horse-power without careful consultation with the manufacturers. Most of the installations of to-day are under boilers of less than 500 horse-power.

The hand stoker has opened up another source of fuel supply for the municipal plant, namely, sawmills, woodworking plants, furniture factories, etc. Industrial establishments of this kind usually have much refuse to dispose of, sometimes at considerable expense to the owners of the plants. Now that hand stokers are coming into prominent use, however, and are so much of an improvement over old-type grates, permitting combustion of wood, sawdust, shavings, mixtures of the three, and mixtures of the three with low grade or high grade coal, there is little excuse these days for permitting the burning of refuse out in the open. On hand stokers adapted to this kind of fuel, refuse from mills makes an excellent cheap fuel.

The writer has before him a letter from a 400-kw. electric power company in which it is stated that refuse is purchased from neighboring plants—shavings, sawdust, bark, etc.—and this refuse is mixed with a little coal. The mixture is placed on grates fired by hand stokers and successfully burned. It is said that the operating cost

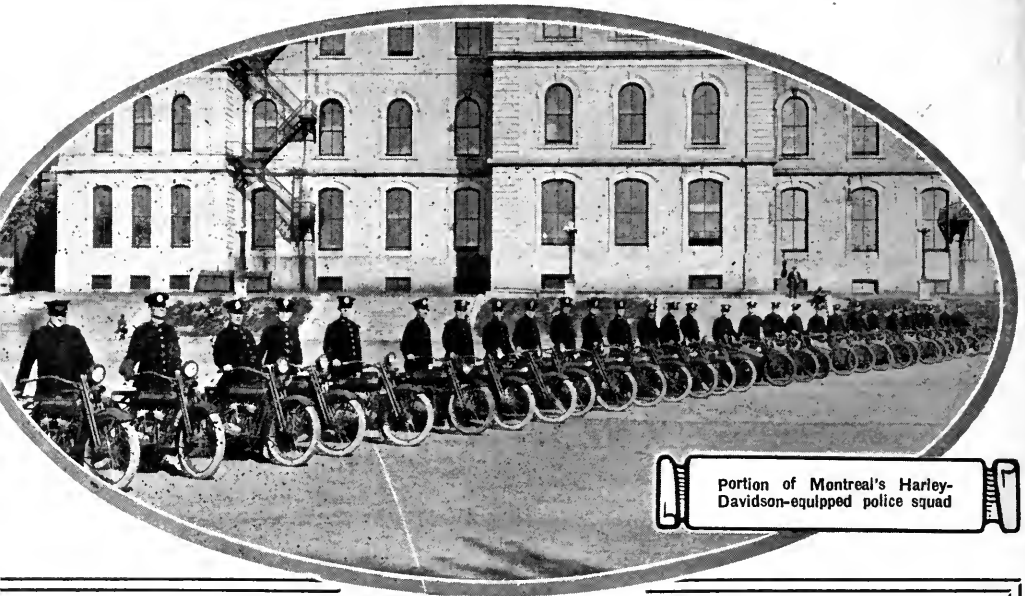
has been cut in two since installation of this more modern type of apparatus. It is also stated that combustion is smokeless.

There are many municipal power-plants scattered over the country that should take advantage of this cheaper method of generating power. The refuse can be hogged up and conveyed long distances with air conveyors at low cost.

Stokers for handling refuse of this kind are successfully placed under steam boilers of all makes and types—water tube and fire tube.

Hand Versus Mechanical Ash Handling

After coal is reduced to ashes the volume is usually very much lessened. The reduction in volume varies all the way from about 90 per cent for anthracite coal to 60 per cent for lignite and bituminous coals. Consequently, the question of hand versus mechanical ash handling is not so important for ashes from high grade coal as is the question of hand versus mechanical stoking. With low grade coal, though, the question of ash handling is more serious. In the larger power-plants, regardless of the quality of coal burned, provision is frequently made for continuous mechanical ash handling, as rapidly as the ashes are rejected by the stoker. This is a desirable method, to be sure, where plants are large enough



Portion of Montreal's Harley-Davidson-equipped police squad

How 43 HARLEY-DAVIDSONS Fight Crime in Montreal

Each of the 23 police stations in Montreal, Canada, is supplied with a Harley-Davidson and sidecar for emergency calls. Twenty other Harley-Davidsons, without sidecars, are on traffic duty—chasing speeders, enforcing traffic rules and parking regulations, and for inspection and messenger service.

An officer on a Harley-Davidson is a crime fighting combination that's hard to beat. For he can go most anywhere, on rough roads or no road at all, and in all kinds of weather.

The low upkeep of a Harley-Davidson will surprise you. 45 miles per gallon of gasoline, 900 miles per gallon of oil, and 5000 miles on tires, are average figures. And its wonderful durability makes repair bills scarce.

Write for your copy of our free book on police use of motorcycles, showing how large cities and small towns alike use Harley-Davidsons profitably. Ask your dealer for demonstration and new reduced prices.

HARLEY-DAVIDSON MOTOR CO.
MILWAUKEE, WISCONSIN

Harley-Davidson
World's Champion Motorcycle

to warrant them. In most plants, however, an ash-pit cleaned periodically is sufficient. The ash-pit should be large enough to take care of 24 hours' operation, and it should be cleaned out twice a day—once a day in emergencies.

Ash-pits should be so designed that they can be easily cleaned. If this cleaning is shirked, the grates are liable to burn as soon as the pit becomes filled with ashes.

To reduce the cost of removing and handling ashes, it is good practice to make arrangements for dumping them into a mechanically operated conveyor of some kind—belt, steam, pneumatic, etc. There are bucket carriers on the market, for example, that are made for conveying both coal and ashes. They are made entirely of metal, are economical and dependable.

It is not sufficient, however, to be satisfied with merely "getting the ashes away from the boiler." Every time ashes are handled it costs money to handle them, until they reach their final resting place. The lower the total cost from the furnace to the final dump, the better. Every step should be carefully planned. Too little attention, usually, is given to the handling of ashes.

The suction method of conveying ashes from the furnace is a tried and successful method. Openings are conveniently placed in front of the ash-pit doors, into which the fireman or attendant simply hoes the ashes. The ashes are then carried away through pipes by high-velocity air currents into an elevated ash storage tank. The air currents are created either by means of steam jets or by means of a blower. When the storage tank is filled, or nearly full, the ashes are removed by gravity into a rail-

road or other car, hauled away and dumped. This method of handling is clean, dustless, convenient and economical. To add to the cleanliness, the ashes are usually "quenched" with water just before entering the storage tank, thus settling the dust.

Where steam jets are used for creating the suction in the suction type of conveyor, we have an almost ideal arrangement in that the ash-handling system has no moving parts whatever. Without moving parts the possibility of wear, breakage and trouble is reduced to the minimum.

In one installation a manufacturer reports a steam ash conveyor system which handles 120 tons of ashes per month. It is claimed that \$90 per week is saved by dispensing with one extra man per shift. The installation, it is claimed, paid for itself in the first seven months of operation.

When choosing an ash-handling system, here are some practical points to look out for:

1. Ashes do not "flow" easily. Be sure that the openings in the bottom of dump-cars and tanks are large enough so that there will be no clogging or arching. Or, see that some mechanical device is provided for agitating the ashes to make them move.

2. In the winter time, beware of freezing. Frozen ashes in overhead storage tanks, in conveyor buckets, railroad cars, etc., may give very expensive trouble.

3. Do not depend entirely on one method of disposal. Sometimes railroads do not operate, truck drivers go on strike, or boats do not move.

4. When ashes are conveyed in pipes, be sure that all elbows, or "wearing backs," where the ashes make a sudden change in direction, are easily replaceable. Special provision must be made for this enormous wear caused by the gritty ash.

The Influence of the Public Health Department Upon the Home

Many of the best managed health departments are extending their services to the home and thereby influencing the condition of the child from birth, and even before birth. This field has not been generally enough invaded. Only a few health departments have undertaken to reach this era in the development of American citizens. This calls for trained workers, visiting nurses, public health nurses, etc. It requires "schools for mothers and fathers." It calls for infant clinics and pure milk

depots. To-day we are endeavoring to give the child a favorable heritage. We are establishing the principle that the rights of society are supreme to the rights of the individual persons who make up society. The contest is fairly comparable to the effort to establish the fact that the rights of the nation are supreme to the rights of the individual states. It is fair to presume that this principle will be established and that future generations will profit thereby. —Michigan Department of Health.



How Does Your Town Fight Snowstorms?

LIKE New York, whose disastrous storm of 1920 proved that the tank-type Cletrac is the one snow fighter that never quits—and where 100 Cletracs are now ready to buck drifts and prevent tie-ups?

Like Minneapolis where, in one ward alone, 5 Cletracs are used to keep streets and sidewalks open, to clear away snow from curbs and sewers, and come to the rescue of stalled traffic?

No? Then why not ask us to tell you about the snow-fighting Cletrac?—and how other cities, small as well as large, are using the same Cletracs for road maintenance in summer and snow-fighting in winter?

THE CLEVELAND TRACTOR CO.

Largest Producers of Tank-Type Tractors in the World

19205 Euclid Ave.

Cleveland, Ohio



HARD THIS
WAY. BUT—



EASY ON A TRACK
THE CLETRAC WAY



DUNBAR AVENUE, EXCELSIOR SPRINGS, MO., SHOWING TEXACO ASPHALT MACADAM PAVEMENT LAID IN 1917, PHOTOGRAPHED 1921

Bituminous Macadam for Resurfacing Hilly and Level Streets in Excelsior Springs, Missouri

By C. A. Shockley

Engineer in Charge of Construction, Excelsior Springs, Mo.

EXCELSIOR SPRINGS is, in a way, in a peculiar position in so far as the municipal government and the making and maintenance of municipal improvements are concerned. The city, which is a health resort, has a resident population of about 4,000, according to the last census, but a transient population of about 5,000 to 6,000, which in no way directly contributes to the maintenance of the municipal administration.

Excelsior Springs is located in the valley of a small stream, Fishing River, the two branches of which form a junction within the city. The valley of the stream is low and flat, but a short way back the country rises in rugged hills. The business and hotel district is confined to the flat, and the residential section is in the hilly district. Some of the streets ascend the hills in curves, making picturesque drives. All the conditions related above had their effect upon the construction of pavements in the city.

Prior to 1917, the city had paved all its business streets, but at that time it was confronted with the improvement of Dunbar Avenue, a highway about one mile in length leading to the depot of the Chicago, Milwaukee and St. Paul Railway. This street was paved with a water-bound macadam, which under traffic and lack of maintenance had become worn and rutted. A good deal

of the property abutting was very short vacant lots, in some cases of little value. As the Missouri law makes the abutting property alone liable for the cost of street improvement, it was necessary that the cost of whatever improvement was made should not confiscate the property. Bituminous macadam resurfacing was decided upon, and the results were such that additional work of the same type was later done.

Method of Construction

The construction involved spiking up and loosening just enough of the top of the old macadam to reshape the roadway to proper crown. Some stone was added to fill the depressions, and the old macadam was finished as a macadam, except that the binding with water was omitted, and prepared as a base.

The wearing course consisted of 3 inches of bituminous macadam. The stone used was a native limestone of ordinary quality. This was applied in a layer 3 inches thick, using uniform 2-inch stone, and was thoroughly rolled and compacted. The binder, which was Texaco asphalt, 96 penetration, was applied by the hand-pouring method. About 2 to 2¼ gallons were applied per square yard at the first application of binder. Stone gradually reduced in size was applied to fill the voids in the surface, until ½-inch stone was used. The squeegee or seal coat

Which Way?



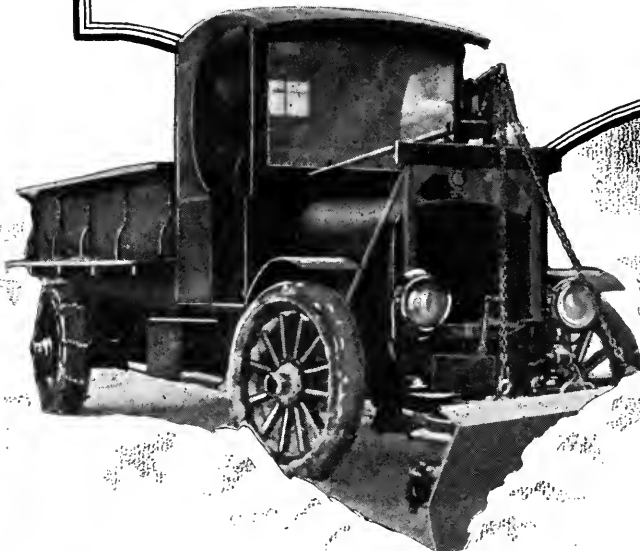
Pick and shovel cannot cope with tons of snow. Only efficient machinery can solve this problem.

WHEN the snows of winter fill the streets and highways, how do you plan to open them so that mail, express, produce and supplies may be properly handled and traffic may not be held up for days at a time?

In February, 1920, New York City was held in the paralyzing grip of a snow blockade for 12 days. The actual money loss to the city due to the interruption of traffic was Sixty Million Dollars. It took twelve days at a cost of five and one-half million dollars to partially clear the streets by the method shown above. In February, 1921, the streets were cleared in 12 hours at a very small cost by the method shown below. Which is the better way?

Without any obligation whatever, we will be glad to send you, on request, our new catalogue of the Champion Snow Plow. It will interest you.

THE GOOD ROADS MACHINERY COMPANY, INC.,
Kennett Square, Pa.



"Champion Snow Plow attached to a Netco Truck, used by the town of Weymouth, Mass."

of binder of $\frac{1}{2}$ - to $\frac{3}{4}$ -gallon per square yard was applied and screenings were added to fill the voids and take up excess asphalt. During the application of stone after the first binder was applied, the rolling was carried on continuously.

The cost of this work in 1917 was 84 cents per square yard. Since that time there has been no expenditure on this street in the way of maintenance. In 1918, some bleeding took place, but the contractor applied sand to take up the binder that came to the surface, and to-day the roadway is in very good condition.

Extending Repairing

The property owners and citizens were so pleased that in 1919, when a movement was started to improve the roadways of Elms Boulevard and Elms Promenade, both of which were paved with water-bound macadam, it was decided to resurface with bituminous macadam. This work was done in the manner indicated above. The accompanying picture shows the condition of Elms Boulevard at this date. The work was done at a cost of \$1.25 per square yard. The increased cost was due to war conditions and the necessity of using a large amount of stone in the preparation of the base. It was not a question of cost in the resurfacing of these two streets, as the property abutting upon them was the best residence property in the city. However, the pavement of Dunbar Avenue had demonstrated its wearing qualities, its noiselessness, sightliness and sanitary conditions. This is what was desired, and, while such conditions could have been secured in other types of pavement, the fact that bituminous macadam would give these conditions at a lower initial cost was sufficient to cause its selection.

Bituminous macadam has been used in the construction of several other streets in Excelsior Springs and has been selected as the surfacing material for the highway from that city to Kansas City, now under construction.



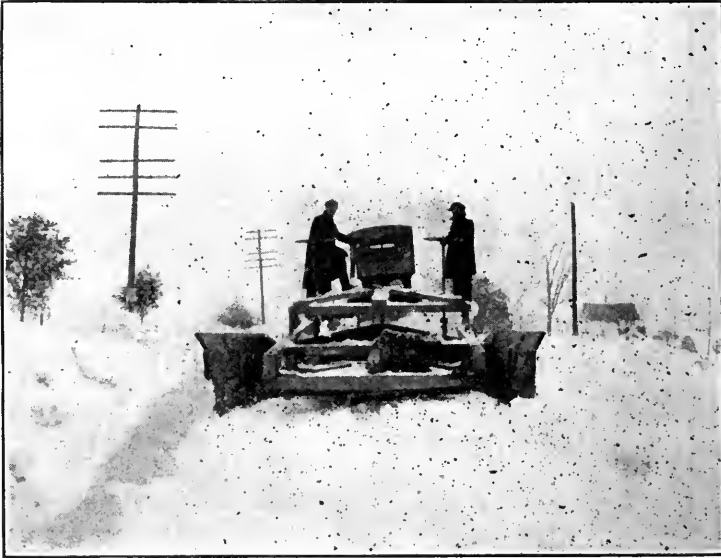
ASPHALT MACADAM PAVEMENT ON ELMS BOULEVARD, EXCELSIOR SPRINGS, MO., LAID IN 1919. PHOTOGRAPH TAKEN IN 1921

The topographical conditions under which this type of construction has been built at Excelsior Springs are extremes. Dunbar Avenue is a street full of curves on its way to the summit of one of the hills, on a grade nowhere less than 7 per cent. Elms Boulevard and Elms Promenade are in the flat, having only enough grade to properly handle the storm water. Both streets are subjected to considerable traffic. There is no traffic restriction of any kind in Excelsior Springs, and both streets are subjected to both passenger and freight traffic.

The conditions which exist that in the opinion of the writer have been vital in giving the results obtained with bituminous macadam are as follows:

1. A solid base; the base in most cases being old macadam which had been compacted under traffic for years and which was firm and solid.
2. Careful graduation of the various sizes of stone, using just enough of the various sizes to fill the voids and have no excess.
3. Use of a good and stable binder, one that will remain plastic under extreme cold and will not become liquid under extreme heat. The temperature of pavement in Excelsior Springs varies from 20 degrees to 130 degrees F.
4. Uniform distribution of the binder with enough to penetrate to the bottom of the wearing surface.
5. Use of a hard, durable, tough limestone.

The work was done under the direction of the writer by P. P. Young, contractor, St. Joseph, Mo., who gave his personal attention and supervision to the work.



Your Most Important Problem Solved

Clearing ten miles of snow four feet high in eight hours' time is answering a winter problem of every town, township and county in the country.

Keeping roads open and usable through any kind of winter weather at the lowest possible expense has been successfully answered by the Phoenix Highway Snow Plow.

Built of selected hardwoods, heavy forgings, castings, and with adjustable wings for

clearing six to twenty feet. Operated by horses—truck or tractor. Plows any depth desired.

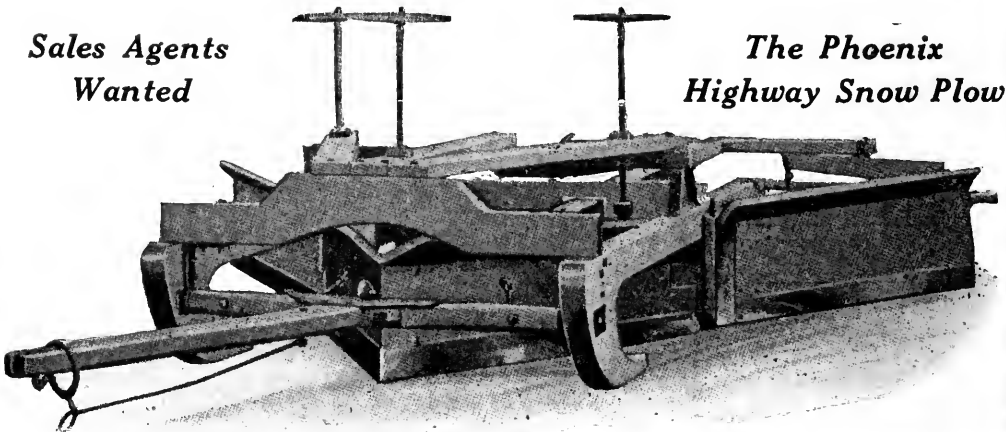
The Phoenix Plow has proved through actual service under the severest conditions to be the most practical and most economical snow plow for town and country roads.

Keep ahead of the snow—keep roads open all winter! Write us today for complete information.

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*Sales Agents
Wanted*

*The Phoenix
Highway Snow Plow*



Municipal Finance

BONDING

ACCOUNTING

TAXATION

Modern Methods of Carrying Bond Elections

By R. E. McDonnell

Burns & McDonnell Engineering Company, Consulting Engineers, Kansas City, Mo.

AS a basis for bond elections, municipal officials usually adopt the method of employing a consulting engineer, who makes his preliminary plans, estimates of cost, and report on the project. The carrying of the bonds is then usually left to the city officials, who with the aid of civic organizations endeavor to interest the voters in support of the project. The failure to carry many worthy projects has caused the writer to adopt modern methods which, upon trial, have proved so successful that it is believed they could with profit be adopted by any city having a bond election under consideration. Bond elections in growing communities are necessary once in about every three years, and in one state last year over one hundred bond elections were held. It is a waste of time, money and energy to place any bond issue before the public without fully informing the voters of every phase of the project, such as feasibility, first cost, and cost of producing the commodity, whether it be water, electricity, gas, heat or ice. Operating costs, fixed charges, revenues and rates to be paid often decide the fate of bond issues.

After twenty-five years' engineering experience in solving municipal problems, the writer is convinced that the carrying of bond elections is an engineering problem and should be handled by the engineer as a part of his duties, rather than that the burden be shifted to city officials, whose office is political and by whom supporters of the administration must be appealed to. Many partisan voters, or "outs," decline to enthrone on a bond project because it is advocated by the "ins." An engineer is employed to handle the work because of his

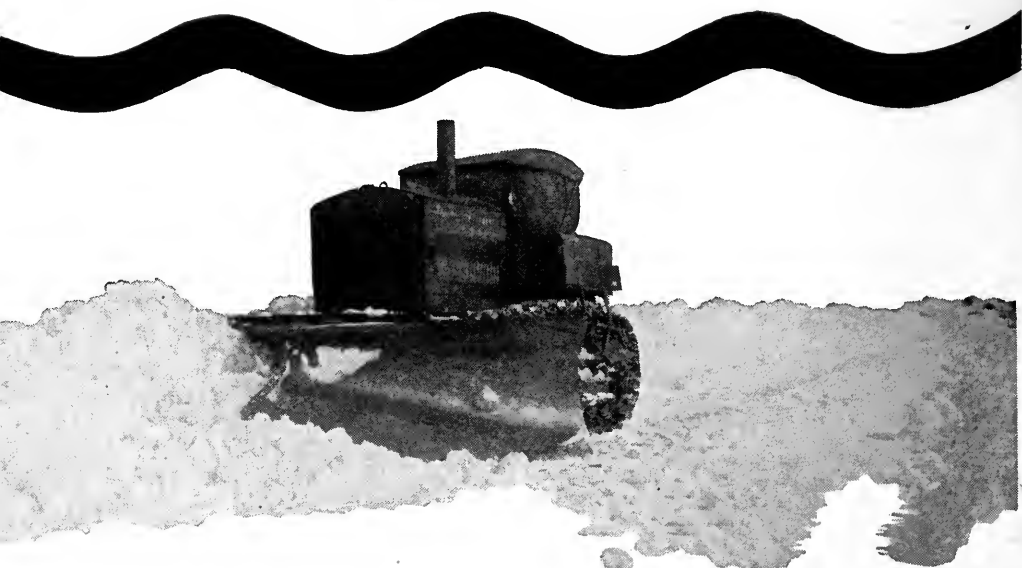
special engineering training and skill, and, having no political ambition, his advice, suggestions and recommendations sound well to a great majority of citizens who find politics and good municipal utilities don't mix.

Votes for bonds are no longer secured by appeals of oratory to "Support the administration," "Have confidence in them, they will spend it honestly," "Show pride in your city," "Our old run-down utilities are a heritage of the last administration," and similar phrases. Nowadays the voters question and analyze the operating and maintenance cost, the up-keep, life of material, etc., and must be shown wherein they are going to be benefited. This critical and proper analysis by the voters, whether men or women, requires a different campaign and it must be one of education along the engineering problems involved. To prepare a fine set of plans or a beautifully bound report no longer satisfies. The job, or bond issue, must be sold to the public, and the buyer, or voter, wants facts, figures and absolute proof that the investment is a profitable one for himself and his home town.

A successful bond campaign for a half-million dollars for rehabilitating the municipal water-works plant at Parsons, Kans., has recently been conducted, and the methods used are outlined as an example of what other cities might accomplish by adopting similar methods.

Facts for the Voters

Preliminary plans, maps, estimates and summaries of the report were prepared on a large scale for use in window displays. About seventy-five stereopticon slides were



For Speedy Snow Removal

Unless your city, township or road district owns a "Caterpillar"* snow removal outfit, the oncoming blizzards may blockade important thoroughfares, stop traffic, cause big losses. Only the "Caterpillar"* has the power and traction to plow through the deepest drifts. New York City's fleet of 50 "Caterpillars"* paid for themselves the first winter. Newark, Minneapolis, Akron, Detroit, and many other up-to-date municipalities are "Caterpillar"*-equipped. "Caterpillars"* do more than insure speedy economical snow removal; they save money on road-working jobs, hauling dirt or refuse, and making park sites. We have an interesting motion picture showing the "Caterpillar"* method of snow removal. Ask to see it!

The "Caterpillar's" usefulness is not limited to snow removal. For road building, working on farm or ranch, in the mining, oil and lumber industries—wherever power and endurance are at a premium, the "Caterpillar"* has no real competitor*

CATERPILLAR
Reg.U.S. Pat.Off.

HOLT
PEORIA, ILL.
STOCKTON, CALIF.

**There is but one "Caterpillar"—Holt builds it*
THE HOLT MFG. CO., Inc., PEORIA, ILL.

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2045-47 Main St., Kansas City, Mo.
Holt Company of Texas, Dallas, Texas

made, and used at mass meetings and before civic organizations. Municipal band concerts were held outdoors, and following the concerts all features of the project were explained—cost estimates, operating expenses, depreciation allowance, bond sinking fund, revenues and rates, with net income, were shown through graphical diagrams. All engineering features were so clearly explained that a prominent attorney, commenting on the project, said: "The engineering is shorn of its technical features and we are now all engineers and see the soundness of the whole project."

The local press expressed a willingness to publish a series of water-works articles, which were prepared by the engineers. These articles were run daily, many of them being illustrated by views showing both the present conditions of the water-works system and the proposed improvements. Over fifty of these articles were prepared and used. They were written, not as a technical journal would use them, but as newsy, interesting items. To test their power to interest readers, an interruption was intentionally made, which caused many 'phone calls of inquiry and request for the articles to continue. Some knowledge of the fifty articles may be gained by quoting some of the titles: "Why the Women of Parsons Want Pure, Soft Water"; "How Good Health Can Be Purchased"; "What Happens When a Water Famine Occurs"; "The Cost of a Typhoid Epidemic." A feature of the improvements was a modern water-purification system to displace a very inadequate and antiquated system. Comparative figures were given showing the saving in cost of operating a modern plant, thus proving to the voters that they were daily losing money by operating an inefficient plant, besides giving the city an unsafe water to drink.

Former bad fires were illustrated, with tables of annual fire losses, showing the fire loss per capita far above that of other cities. Insurance rates were shown to be exorbitant because of the present inadequate protection. Fire losses due entirely to poor pressure were shown to exceed the total bond issue asked. A portion of the improvements consisted of replacing a large amount of small steel and wrought iron pipe, also replacing a flow line of spiral riveted steel and vitrified pipe. The leakage figures were given, showing a loss of over half the water

pumped. Exhibits of this worn-out pipe were placed at prominent street corners with placards giving age, when removed, etc. The per capita cost of the Parsons proposed improvements was shown to be less than that of about twenty-five cities similarly situated.

The publicity campaign through the papers and by personal presentation of the plans before civic organizations continued for four weeks, with an intensive speaking campaign for one week, when twenty-one meetings were addressed, in explaining the engineering, economic and health features of the project. Noon meetings were addressed, when factory, shop and office employes were reached. Slides were daily distributed to all the picture shows, showing some special features of the improvements. Local speakers were organized and ten-minute talks at all picture shows were made during the closing week.

The women voters, through the Parsons Federated Women's Clubs, sponsored the final mass meeting, bringing before the women voters the importance of the water-supply.

Home owners were clearly shown by figures that not a dollar of taxes would be added, but that the revenue would make the plant self-supporting.

In their articles and talks the engineers refrained from directly urging the voters to support the bonds, but took the position of a disinterested consulting physician to a sick utility, and presented their prescription for the patient in the form of plans, estimates and report, and all features of these were clearly explained, leaving the voters to form their own conclusions as to whether they wanted to vote for or against the bond issue.

The prescription offered was taken, the bonds were carried, and the half-million-dollar improvement is now being carried out under the guidance of the engineers, with the expectation that the sick utility will soon be restored to health.

The engineers have found from experience that the same methods of bond campaigning are applicable in dealing with any municipal improvement. It has recently been successfully applied on bonds for sewage disposal, electric lighting and municipal ownership of several utilities.

ACKNOWLEDGMENT.—From a paper presented before the Annual Meeting of the Kansas League of Municipalities.

Officially Recommended

Having in mind the importance of guarding against over-issue and forgery of Municipal Bonds, the Junior Chamber of Commerce of Birmingham, Ala., recently recommended that the preparation of the City's Bonds "be committed to a nationally known Trust Company * * * as a means of making the Bonds more attractive to purchasers."

This Company has prepared and certified nearly \$400,000,000 in Bond issues for over 600 cities and towns, including Birmingham, Ala.

Official depository of INVESTMENT BANKERS' ASSOCIATION of America for Attorneys' opinions and legal papers. Descriptive booklet "Municipal and Corporation Bonds," and list of Opinions on file will be sent on request. Inquiries welcomed.

UNITED STATES MORTGAGE & TRUST COMPANY

Capital and Surplus, \$6,000,000

NEW YORK

General Banking and Trust Facilities

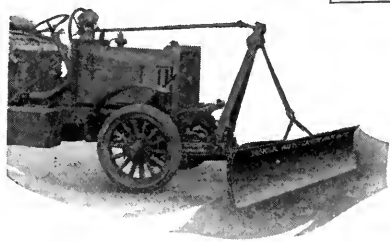
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SNOW PLOWS

For Standard
Motor Trucks
and Tractors



Special Snow Plow for Fordson Tractor



BAKER Auto Truck Snow Plow

In Baker Snow Plows you get the highest type of snow plow made. Patent, hinged, spring-supported blades prevent injury to the plow. Used only on Baker Snow Plows. Simple, sturdy, practical construction—the result of our long experience in making snow plows. We can help you move snow. Make your motor trucks and tractors useful all year 'round.

Write or wire for Catalog No. 78

THE BAKER MFG. CO.

503 Stanford Ave.

Springfield, Ill.

Municipal Bond News

THE city administration of Sacramento, Calif., has under consideration the erection of a municipal auditorium costing about \$300,000. If the plans materialize, the necessary bond issue will be brought to a vote.

At a recent election, Poplar Bluffs, Mo., voted to issue bonds for \$45,000 for improvements in the water, light, and sewer departments, and for the purchase of an additional fire engine.

Robinson, Ill., is considering a bond issue for the purchase of fire apparatus.

Karnes City, Tex., has voted on and approved a bond issue of \$65,000 for the installation of a water-works system.

Lansing, Mich., has for sale in the Treasurer's office \$100,000 of water-works bonds and \$100,000 of sewer bonds.

On November 26, Oklahoma City, Okla., will vote on bond issues totalling nearly \$7,000,000 including the following items:

Water purification and main extensions..	\$1,600,000
Sewage disposal	2,100,000
Storm sewers	1,490,000
Sanitary main sewers.....	58,600
Fire department equipment.....	250,000
Parks	500,000
River straightening	1,000,000
Tubercular Hospital	200,000

Paris, Tex., offers for sale a one-million-dollar bond issue for new reservoir, pumping and filtration plants.

Centralia, Tex., has voted bond issues for water-works and sewerage, \$60,000 and \$30,000 respectively.

Greensboro, N. C., proposes to issue \$300,000 in water bonds and \$75,000 in sewerage bonds this winter, also \$200,000 for street improvements.

Davenport, Ia., has passed a bond issue amounting to \$475,000 for storm drains, grading, and other work.

Gadsden, Ala., has a small issue of street improvement bonds for sale.

Brownsville, Tex., has just voted \$100,000 for street paving.

Cedar Rapids, Ia., will soon vote on the financing of a seven-and-a-half-million-dollar concrete reservoir and three miles of pipe lines.

Kinston, S. C., has sold to A. B. Leach and Co., Inc., of New York, \$300,000 6 per cent electric light plant bonds. These bonds were prepared and are certified by the United States Mortgage and Trust Company, New York.

La Grande, Ore., voted November 1 on a bond issue to improve and repair its water-works system.

Citizens of Milton and Freewater, Ore., have endorsed the proposition of bonding Umatilla County for \$1,000,000 for road building.

The County Commissioners of Cascade County, Mont., are offering \$200,000 high-way bonds.

Wilbarger County, Tex., is planning an issue of road bonds to the amount of \$600,000.

The Board of County Commissioners of Nez Perce County, Ida., intend to re-advertise \$400,000 bridge and country road bonds.

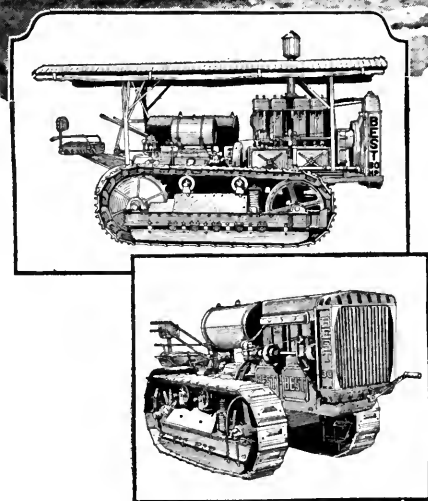
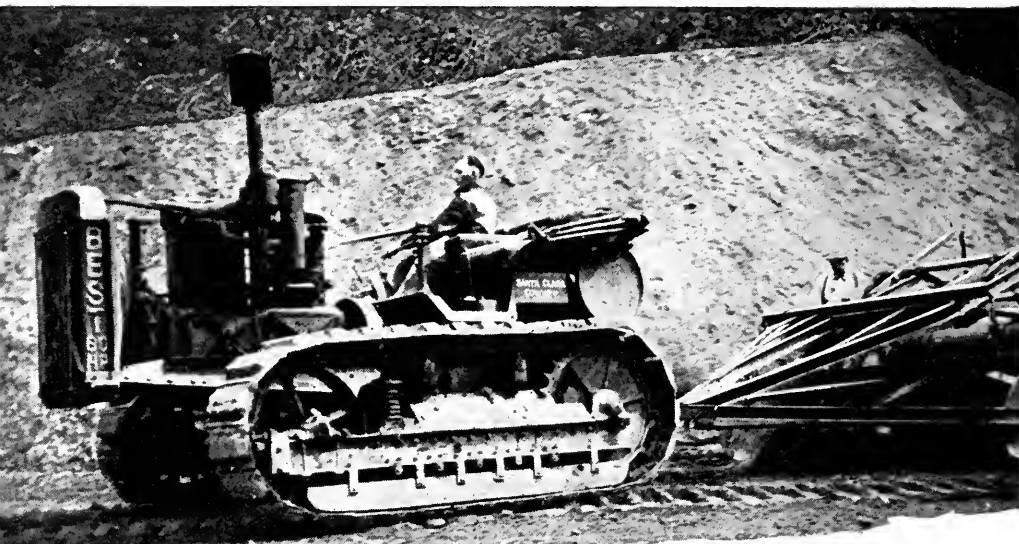
Duncan, Okla., has voted \$300,000 for electric light equipment.

McCraken, Kans., has recently voted \$55,000 of bonds for improving its water and light plant.

The two new bond issues offered October 29, one by the city of Philadelphia and one by the state of California, are the first which have broken the 5 per cent ice, says the *New York Times*. This figure has recently been broken in the case of a number of issues offering special inducements. Opinion is growing that a rate of 4½ per cent for the first grade municipals may be seen about the first of the year.

The following table, compiled by *The Daily Bond Buyer*, of New York, shows the sales of new state and municipal bonds in September and the nine months ending September 30 for ten years:

	September	Nine Months
1921	\$97,743,218	\$805,707,801
1920	70,712,000	564,902,596
1919	72,787,076	517,491,709
1918	19,790,397	206,982,540
1917	34,283,642	366,764,292
1916	19,399,642	376,341,515
1915	28,768,418	395,364,676
1914	12,430,549	370,662,659
1913	26,824,615	294,044,234
1912	15,495,458	331,678,861



BEST TRACKLAYER TRACTORS

The picture above shows the Best "Cruiser" doing road work with a Schmeiser leveler. The center picture shows the Best Tracklayer "Sixty" and the lower picture is the "Thirty". All three models of Best Tracklayer Tractors are factory-built—not assembled.

Tractors Have Many Advantages

One advantage a good tractor has over animals is the ability to work fast in close quarters.

Power is in compact form, easily manipulated and managed by one man. The pull is steady. No easing up when plows, grader, etc., strikes the tough spots. The work is thorough and the speed fast.

In fact, the right kind of tractor reduces the cost of major operations in road, street and highway construction and maintenance. It cuts down time, reduces labor and eliminates the feed bills.

This year, more than ever, interest centers around reduction of operating expenses. Good tractors, such as Best Tracklayer Tractors, can do much to reduce this cost.

An investigation will show that Best Tracklayer Tractors have earned a reputation for long life, stamina and low operating cost during the many years they have been successfully performing on heavy-duty work.

A request will bring data on Best Tracklayer Tractors, specifications, prices and the names of our nearest dealers. Now is the time to look into the question of good tractors.

C. L. BEST TRACTOR CO.

San Leandro

California

The City's Legal Rights and Duties

Information for City Attorneys and Other Municipal Officers, Summarizing
Important Court Decisions and Legislation

Conducted by A. L. H. Street, Attorney at Law

Municipal Auditorium May Be Acquired Under Charter Power to Acquire Property for the "Public Welfare"

A section of the Kentucky statutes empowers cities of the second class to "purchase, rent or lease, within the limits of the city or elsewhere, any real or personal property for the use of the city, and to control, manage, improve, sell, lease or otherwise dispose of the same, for such purposes and considerations as they may deem proper for the public welfare." This section is held by the Court of Appeals of the commonwealth to be broad enough to authorize acquisition of a building to be used as a public auditorium and municipal office building. (Wilkerson vs. City of Lexington, 22 Southwestern Reporter, 74) The Court says:

"Clearly the power to purchase and improve real estate for such purposes and considerations as the board of commissioners may deem proper for the public welfare is very broad and comprehensive, and carried with it full authority to purchase a site and erect thereon a suitable building to house the municipal offices, and for use as a commodious and convenient auditorium in which the citizens may exercise their right of assembling and discussing public affairs, and this power carries with it as a necessary incident the further power to incur indebtedness and levy taxes for such purpose."

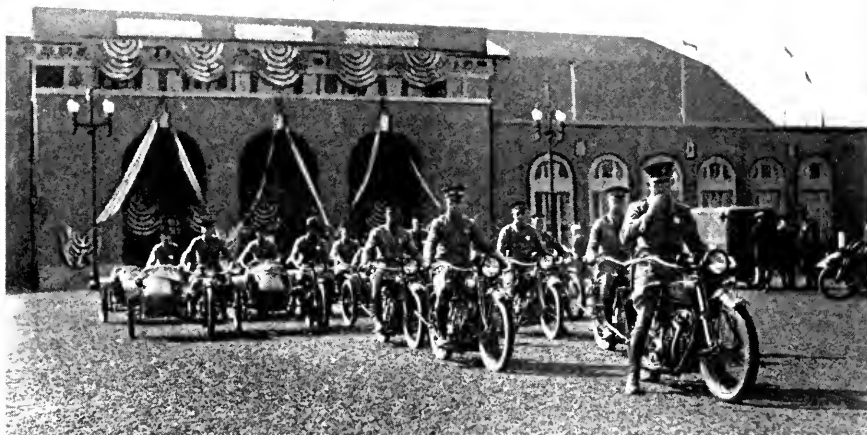
City Held Not Liable for Unauthorized Order of Materials by Building Committee's Chairman

The city of Newark is held not liable for materials and labor furnished on orders of the chairman of the public building committee of the City Council, the orders not having been authorized by the city, nor by the committee of which he was chairman, and the Council not having ratified the orders or any like orders. (New Jersey Supreme Court, McLean vs. Mayor and Common Council of Newark, 110 Atlantic Reporter, 692.)

Bidder for Municipal Work Entitled to Withdraw Proposal at Any Time Before Acceptance

Defendant city advertised for proposals for the construction of a fire station and library building, requiring deposit by each bidder of a cashier's check as a forfeit in the event of refusal of the bidder to enter into a contract. Plaintiff and others submitted proposals, and a bidder other than plaintiff was awarded the contract. Plaintiff demanded return of its check, which demand was rejected. Later the successful bidder's check was forfeited for refusal to enter into a contract, and plaintiff was notified that its bid was accepted. Plaintiff declined to contract, and sued to recover the amount of the check deposited by it, the same having been cashed by the city in the meantime. Upholding plaintiff's right to recover, and reversing a contrary holding by the trial court from which an appeal had been taken, the South Dakota Supreme Court says (Gray Construction Co. vs. City of Sioux Falls, 179 Northwestern Reporter, 497):

"We do not deem it necessary to determine the contention of appellant [plaintiff] that the acceptance of another's bid was a rejection of its bid. Neither do we deem it necessary to determine whether or not, if appellant had allowed its deposit to remain with respondent [the city], and in no manner had indicated its intention to withdraw its offer as expressed in its bid, such bid would be held to be a continuing offer, and subject to acceptance at respondent's election. We are clear that, there being no statute or ordinance otherwise providing, when appellant demanded the return of its cashier's check, it exercised an absolute right, which it possessed at all times, to withdraw the offer contained in its bid. Although appellant did not withdraw its offer until after the bids were opened, it did in effect withdraw such offer when it demanded the return of its check. Being absolutely entitled to the return of such check upon demand at any time before its offer had been accepted, respondent became liable to it when it converted such check to its own use and benefit."



Massachusetts adds Twenty

Indian Scouts

to her State Police present Indian equipment

After a test of over three weeks, during which time the Indian Scout was subjected to the most severe and unusual tests possible. This order is one of the finest tributes the Scout has ever received.



Write for literature covering the 1922 models.

Numerous improvements.

Two brand new models.

Substantial price reductions.

Address Municipal Dept.

Hendee Manufacturing Company

Largest Motorcycle Manufacturer in the World

Springfield, Massachusetts

Tuberculosis Hospital Held Not to Constitute a Nuisance as Against Residential Property Owners

The right of the city of Fall River to establish a tuberculosis hospital over the objections of residential property near-by, is upheld by the Massachusetts Supreme Judicial Court in a suit brought by one Cook and others.

The site selected is part of a forty-acre tract on which the city has long maintained a general hospital and has, for several years, treated tubercular patients in tents, etc. Plaintiffs complained that the tubercular hospital will affect the comfortable enjoyment of their near-by homes, and that their property may depreciate in value. A referee who took testimony in the case reported that there will be very little danger of infection on account of proximity of the hospital, provided that the institution be properly managed, and that there will be no substantial depreciation in land values after the hospital has been in existence for a time.

Affirming a decree denying an injunction, the Supreme Judicial Court says:

"Practically the same conditions prevail as to all the sites considered, and the local health authorities consider this site more suitable from a public health point of view than any other that is available. The controlling fact is that the master is 'unable to find that the erection and maintenance of a well-equipped and controlled tuberculosis municipal hospital will inevitably create a nuisance.' He finds:

"Experience has demonstrated that there is no real danger from a well-conducted hospital or sanatorium and there is no valid reason for fear in regard to it. Whatever danger of infection there may be will be no greater to the neighborhood in the Highland section than there would be wherever said hospital would be located, and, if there is any danger to be expected from patients traversing the streets in traveling to and from the hospital, that danger would be the same wherever the hospital would be located."

"On these facts the judge could not enjoin the defendant without virtually nullifying the statute which requires the city to maintain a tuberculosis hospital within its limits, as the objections raised by these petitioners apply with at least equal force to every other available site. Hospitals for contagious diseases must be established and maintained for the protection of the general public; and it is not to be assumed in advance that such a hospital, well equipped and managed under the supervision of public health boards, will be a nuisance. *Manning vs. Bruce*, 186 Mass. 282, 71 N. E. 537. In *Anon.*, 3 Atk. 750, 751, on a motion for an injunction to stay the building of a house to inoculate for the smallpox, it was said by Lord Hardwicke:

"The fears of mankind, though they may be reasonable ones, will not create a nuisance."

"Without going so far as to say that purely mental discomfort cannot constitute a nuisance, certainly the law will not enjoin the erection of a municipal hospital on facts such as are disclosed by this record, in order to protect the plaintiffs from dangers which are found to be unreal. . . . Depreciation of the market value of the petitioners' land, assuming it to be proved, would not be decisive in their favor."

City Having in Good Faith Paid Salary to Incumbent, Held Not Liable to Again Pay It to Successful Contestant

The decision of the Kansas City Court of Appeals in the case of *Luth vs. Kansas City*, 218 Southwestern Reporter, 901, deals with the interesting question as to whether, if a municipal official's right to office has been successfully contested by another, the fact that the salary has been paid to the unsuccessful contestee, the *de facto* official, during his incumbency in the office is a defense on the part of the city to liability to pay the salary for the same period to the contestant, the *de jure* official. The Court says:

"In this state it is held that a salary is attached to and depends upon the legal title to the office, and that the *de jure* claimant is entitled to the salary, even though he has not occupied the office or performed the duties thereof. . . . And following the logical result of the rule stated in those cases it was held in *Sheridan vs. St. Louis*, 183 Mo. 25 . . . that a *de facto* officer, who has performed the functions of the office, cannot recover the salary attached to such office."

"If the *de facto* officer has been paid the salary, can the *de jure* officer compel the municipality to pay again to him? Those courts which deny outright that this can be done put it on the ground that, since there is no contractual right with the public to a salary, it is but good policy to protect the public from a second payment, and also the necessity that public official functions shall be performed by some one, whether he be the rightful one or otherwise."

"Other courts qualify that rule by the statement that the payment to the *de facto* officer must have been in good faith. The following is quoted approvingly from *Mechem on Public Office and Officers*, sec. 332 . . . :

"If payment of the salary or other compensation be made by the government in good faith to the officer *de facto* while he is still in possession of the office, the government cannot be compelled to pay it a second time to the officer *de jure* when he has recovered the office, at least when the officer *de facto* held by color of title."

As supporting the last-stated rule, the Court cited decisions of the highest courts of Missouri, Illinois and Connecticut.

Curious facts about streets as recorded in an engineer's note book



Niagara Square, Buffalo, N. Y., with McKinley Monument

What I Found in Buffalo, N. Y.

Oldest asphalt pavements in the United States—streets still in splendid condition after 30 and even 40 years' service. Remarkable because weather conditions in Buffalo are exceptionally severe. Temperature ranges from 14 degrees below zero in winter to 95 degrees above in summer—a variation of 109 degrees.

One street laid with Trinidad Asphalt in 1881, forty years ago. Maintenance cost only three cents a square yard per year to date. Another, laid with Trinidad two years later, has cost only two and a half cents per yard per year.

Carefully examined dozen or more other Trinidad Lake Asphalt streets. Most of them still in fine condition. Hold records for low maintenance cost. Average age of Trinidad streets over 21 years.

Bureau of Engineering records show city has laid nothing but native-lake asphalt since 1905. Previously tried out eight different kinds of bituminous paving materials. City has 4,838,792 square yards of paving, of which 4,185,025 square yards are Trinidad—more than 90 per cent. Shows what Buffalo engineers think of native-lake asphalt.

Results unquestionably prove superiority of Trinidad. Has withstood most severe kind of traffic and weather conditions. Nothing equals it in economy of maintenance. Would pay any city contemplating asphalt pavements to study records of Buffalo before deciding on other than native-lake asphalt.



The Genasco Line includes asphaltic roofing, flooring, paints and allied protective products. Write for descriptive matter.

New York
Chicago
Pittsburgh

THE BARBER ASPHALT
COMPANY
PHILADELPHIA

St. Louis
Kansas City
Atlanta
San Francisco

TRINIDAD LAKE ASPHALT

Municipal and Civic Publications

Prices do not include postage unless so stated.

ECONOMICS OF BRIDGEWORK: A SEQUEL TO BRIDGE ENGINEERING

By J. A. L. Waddell. John Wiley & Sons, Inc., New York. 1921. XXXII + 512 pp. Diagrams, tables and illustrations. Price \$6.00.

This book presents in a practical and authoritative manner, in shape readily available for use by the practicing engineer, a solution of all the major economic problems in bridgework and an extensive treatment of most of the minor problems. The major problems which are discussed cover steel arch bridges, cantilever and suspension bridges, span lengths for simple truss bridges in various types of construction, possibilities and economics of the transbordur, continuous and non-continuous trusses, wire cables and high-alloy-steel eye-bar-cables for long-span suspension bridges, reinforced-concrete steam-railway bridges, bridges versus tunnels for river crossings, and movable spans.

CONCRETE WORK, VOLUME II

By William Kendrick Hatt, Professor of Civil Engineering, Purdue University, and Walter C. Voss, Head, Department of Architectural Construction, Wentworth Institute, Boston, Mass. John Wiley & Sons, Inc., New York. 1921. XV + 206 pp. Figures, diagrams and job sheets. \$2.00.

A practical book of concrete work for the contractor, the student of concrete engineering, and the foreman. The job sheets contained in this volume uncover to the worker the fundamental principles and operations of computing, selection of materials, mixing and placing concrete. They are classified into elementary operations, tests of materials, inspection of construction, construction methods, study of materials and methods, experiments and information.

ANALYSIS OF THE ELECTRIC RAILWAY PROBLEM

Delos F. Wilcox, Ph.D., Consulting Franchise and Public Utility Expert. The Afferton Press, New York. XX + 789 pp. 1921. \$10.

This volume is a report to the Federal Electric Railways Commission, with summary and recommendations, supplemented by special studies of local transportation issues in the state of New Jersey and the city of Denver, with notes on recent developments in the electric railway field. Almost encyclopedic in size and thoroughly indexed, this work is a very complete discussion of the electric railway problem in the United States.

LONDON OF THE FUTURE

The London Society, under the editorship of Sir Aston Webb, K.C.V.O., C.B., P.R.A. E. P. Dutton and Company, New York. 286 pp. Illustrated. 1921. \$15.

For every person interested in city planning this volume will be found of the greatest value. It is an analysis of London from his standpoint, discussing the mistakes of the past, the opportunities of the present, and the possibilities of the future.

OUTLINES OF PUBLIC FINANCE

Merlin Harold Hunter, Ph.D., Assistant Professor of Economics, University of Illinois. Harper and Brothers, New York. XVIII + 533 pp. 1921. \$3.25.

This book is designed to help the general reader, the student, and the public official to secure a better understanding of the nature of public expenditures and revenues, and the principles which underlie a sound fiscal system. The chapters on excise and business taxes, the property tax, and the discussion of the single tax will be of special interest to municipal officials, as well as the pages devoted to the administration of municipal finances.

THE TECHNIQUE OF PAGEANTRY

Linwood Taft, Ph.D., Chairman of the Department of Pageants and Festivals for the Drama League of America. A. S. Barnes and Company, New York. VII + 168 pp. Illustrated. 1921. \$2.

Through experience in directing pageants in about 25 cities in the United States the author came to the conclusion that pageantry is the most appropriate medium of expression of one phase of community life. This volume will be found to contain a great quantity of practical suggestions for cities and towns planning to give pageants descriptive of their community life and history.

AMERICAN POLICE ADMINISTRATION

Elmer D. Graper, of the New York Bureau of Municipal Research. The Macmillan Company, New York. VI + 367 pp. 1921. \$3.50.

This handbook is devoted to a consideration of various phases of the police problem. Its purpose is to make available information as to what American cities are doing in finding solutions to various phases of the problem and to deducing the general conclusions relative to good police practice that may be drawn on the basis of this information.

AIRCRAFT YEAR BOOK

The Manufacturers' Aircraft Association, Inc. 285 pp. Illustrated. 1921. \$3.

This volume covers the developments of aviation for the year 1920. For the municipal official and chamber of commerce executive the chapters on Aerial Photography, with emphasis on its part in city planning, and on Air Ports, Ground Organization and Aerial Communication will be found to contain practical suggestions of direct interest.

THE CITY SLEEPS

Charles Mulford Robinson. The Cornhill Company, Boston. 129 pp. Illustrated. 1921. \$1.50.

Readers of *The American City* familiar with the city-planning work of the late Mr. Robinson will be interested in learning of this little volume containing selections from his writings, both poems and prose sketches, chosen and edited by his wife.

THE BOLENIUS READERS

Fourth, Fifth and Sixth Readers, with a Teachers' Manual. Emma Miller Bolenius. Houghton Mifflin Company, New York. Illustrated. 1919. \$3.72.

These readers are prepared with the object of giving children training in silent, as well as oral, reading. Many of the selections are calculated to develop strong civic and patriotic sentiment.

THE ELEMENTS OF SPECIFICATION WRITING

By Richard Sheldon Kirby, Assistant Professor, Sheffield Scientific School, Yale University. Second edition, revised. John Wiley & Sons, Inc. New York. 1921. VII + 153 pp. Price \$1.50.

Specification writing is both an art and a science, and the revision of Professor Kirby's well-known book clarifies all the points which the civil engineer needs in the preparation of specifications, contracts, advertisements and proposals.

NATIONAL BOARD OF FIRE UNDERWRITERS

Two pamphlets. "Regulations of the National Board of Fire Underwriters for the Installation of Rotary and Centrifugal Fire Pumps and for Electrical Driving and Gasoline Driving of Fire Pumps"; and "List of Inspected Mechanical Appliances." 1921. Published by Underwriters' Laboratories, 207 East Ohio street, Chicago, Ill. (Apply to publishers.)

PRACTICAL POLITICS

"Civic Lessons from Mayor Mitchell's Defeat," by Eda Amberg and William H. Allen. Published by the Institute for Public Service, 423 West 120th street, New York City. 96 pp. 1921. A clear analysis of the principal reasons for the defeat of Fusion Reform in New York City in 1917. (Apply to publishers.)

THE CITY PLAN AND LIVING CONDITIONS

"The City Plan and Living and Working Conditions," by John Ihlder, Manager, Civic Development Department, Chamber of Commerce of the United States. 1921. 15 pp. A very interesting paper presented before the National Conference on City Planning. (Apply to author, Washington, D. C.)

FIRE PROTECTION

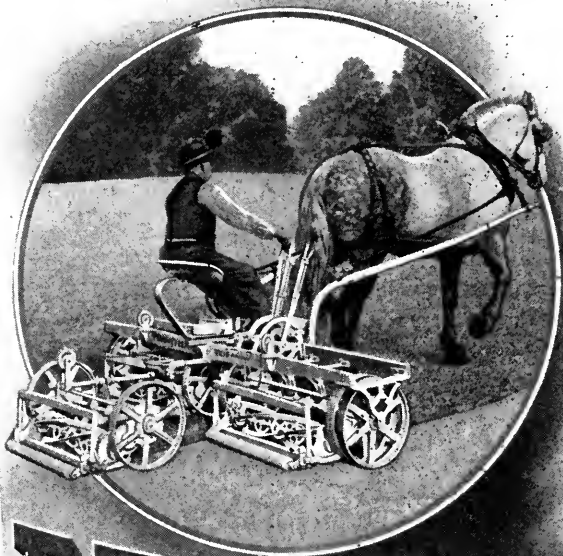
Proceedings of the Twenty-fifth Annual Meeting of the National Fire Protection Association, held in San Francisco, June 14-16, 1921. 400 pp. For members only. \$1. (Apply to the National Fire Protection Association, 87 Milk Street, Boston, Mass.)

CORRECTION

Applications for copies of the "Jersey City Development Plan," listed in *The American City* for October, should be addressed to Philip Guise, Secretary, Board of Engineers of Jersey City, Jersey City, N. J.

THE AMERICAN CITY

"PENNSYLVANIA TRIO"



THE "PENNSYLVANIA TRIO" is the culmination of the famous Pennsylvania Quality Line. It embodies all the exclusive quality features. No other mower will cut grass on golf courses, big estates or parks as efficiently, economically or speedily.

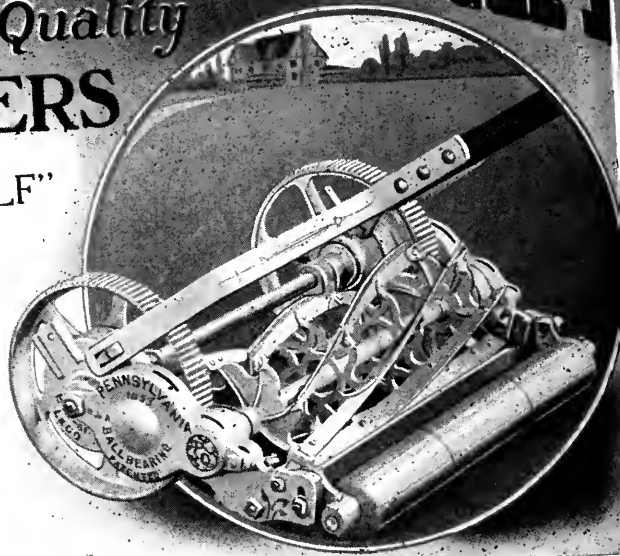
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Quality

LAWN MOWERS

"PENNSYLVANIA GOLF"

The "Pennsylvania Golf" has no rival when close cutting is required on tennis courts, putting-greens and lawns. It trims $\frac{3}{16}$ of an inch. All its blades are crucible tool steel; self-sharpening.



Write for "Pennsylvania Book"

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1615 North 23rd Street, Philadelphia, Pa.

When writing to Advertisers please mention THE AMERICAN CITY.

Methods, Materials and Appliances

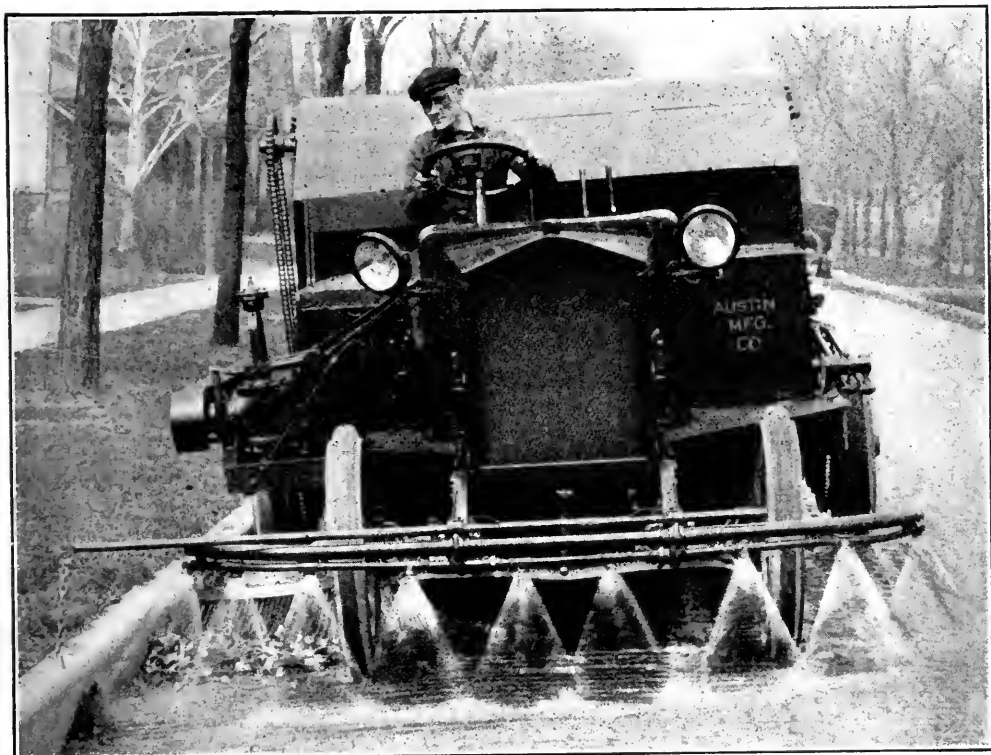
News for Boards of Public Works, Engineers, Contractors, Purchasing Agents, and Others Interested in the Economical Construction and Efficient Operation of Public Improvement Undertakings

The Austin Motor Street Sweeper

The new Austin motor street sweeper replaces the ordinary horse-drawn sprinkler and street sweeping machine with its customary crew of white wings, and is claimed to accomplish better results with no dust, less expense and in a more sanitary and efficient manner. The chassis of this machine, illustrated below, is of the four-wheel type, built so that the driver has an unobstructed view to the front and both sides, which is necessary for the effective operation of the machine and for the safety of pedestrians and children. The machine is practically noiseless, making it suitable for use in residential districts and at night without disturbance, thereby permitting 24-hour service when necessary. The machine sweeps the dirt

from the gutter into the path of the main broom, which in turns sweeps it upon a carrier without damaging the pavement, elevates the dirt to an ample hopper, and finally carries it to its dumping point.

Experience has shown that one of the most important parts of a motor sweeper is the pick-up or elevating device, and a great deal of thought and attention has been given to this part of the Austin machine. The elevator consists primarily of a sheet-steel inclined plane on which the dirt, when thrown by the broom, is picked up by a series of rubber squeegees mounted at frequent intervals on a steel conveying chain, and carried to the top of the plane, where it drops into the hopper. These squeegees are of heavy rubber composition strengthened on each side by steel strips and carried on high carbon steel chains. On reach-



CLEANING A GUTTER AND A GENEROUS SWATH OF STREET AT ONE TIME WITH A PICK-UP SWEEPER



THE WORTHINGTON TRACTOR AND SHAWNEE MOWER

The Shawnee Triple Mower has become the main dependence for parks, golf fairways and lawns of large estates throughout the country.

It is drawn easily by one horse.

In combination with the Worthington Tractor it will mow four times as much lawn area as any other mowing apparatus in the world.

The Tractor is especially designed for lawn service. It improves the turf and does not mar or injure the surface. It has patented features which have given it immediate preeminence.

It displaces the horse and reduces the cost of the mowing operation one-half.

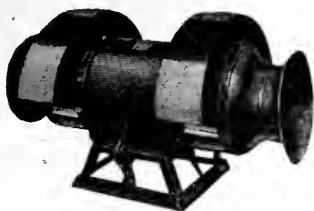
The gang mower alone and in combination with a tractor is broadly covered by patents owned by this company.

WORTHINGTON MOWER COMPANY
Shawnee-on-Delaware, Pa.

ing the top of the plane they snap themselves free from dirt, pass over the top of the sprocket, and return for another circuit.

The Siren as a Fire Alarm

The demand in small communities for a distinct and unmistakable warning signal for use in case of fire or disaster has brought forth the development of powerful electric sirens as fire alarms. Under the régime of bells, whistles and steel rims, considerable confusion sometimes existed when these alarm signals were mistaken for locomotive bells and whistles, and other common sounds. Factory whistles were sometimes used as a signal of fire, but these were particularly confusing and easily mistaken, as they were blown daily to indicate to the factory employes the starting of work, lunch



THE STERLING SIREN

periods, and the closing of the plant. In a great many cases, factory whistles have been discontinued because of the fact that steam is being supplanted by electrical current more and more each day.

When these old methods were used, fire department volunteers, scattered around various parts of the town and working in the fields, often failed to respond in full strength on account of misinterpreting the signal, and fires have sometimes gained great headway before sufficient help could be summoned. One of the most widely used fire department electric sirens is the "Sterling," sold exclusively under new arrangement by the American-LaFrance Fire Engine Company, Inc., of Elmira, N. Y. Many of these have now been installed in the smaller towns throughout the country.

Once heard, the "note" of the Sterling electric siren can never be forgotten. Its blast begins with a deep moaning sound, which gradually increases in pitch until its highest note produces a shrill shriek. The electrical contact is then broken and the siren is allowed to descend the scale. This operation is repeated over and over again until the main contact is finally broken by the operator. The Sterling siren is made in two sizes, single and double head. The double-head siren is really two sirens built in one and possesses approximately twice the volume of sound produced by the single head. The note of the single-head siren may be heard up to a distance of $1\frac{1}{2}$ miles, whereas the double-head siren sends its warning over an area of 2 to $2\frac{1}{2}$ miles. Under favorable wind conditions the carrying power of both these types may be somewhat increased.

Heine Boiler Personnel

The Heine Safety Boiler Company, St. Louis, Mo., has just issued an announcement giving an outline of the various activities of the personnel of its engineering staff.

John Hunter was formerly chief engineer of the Union Electric Light and Power Company, St. Louis. The results obtained at the Ashley Street station of this company under his administration were remarkable. By reallocation of units, increased efficiency and judicious additions to equipment, the capacity was increased from 12,000 to 116,000 kilowatts without increase in the size of the building. During the war Mr. Hunter was in charge of the yard of the Standard Shipbuilding Corporation at Shooter's Island, N. Y.

Charles H. Stoddard was formerly chief engineer of the Moore Shipbuilding Company, San Francisco, Calif., and previously civilian superintendent of shops at Mare Island Navy Yard. His experience in designing a great variety of machinery has been equalled by few men in this country.

Alfred Cotton was one of the pioneers in making the early refinements to mechanical stokers, when he was in the employ of Thomas Henderson, Liverpool, England. He also designed one of the first multi-stage centrifugal pumps. As chief assistant engineer for Meldrum Brothers, Ltd., Manchester, England, he collaborated in the development of the Meldrum municipal refuse destructor.

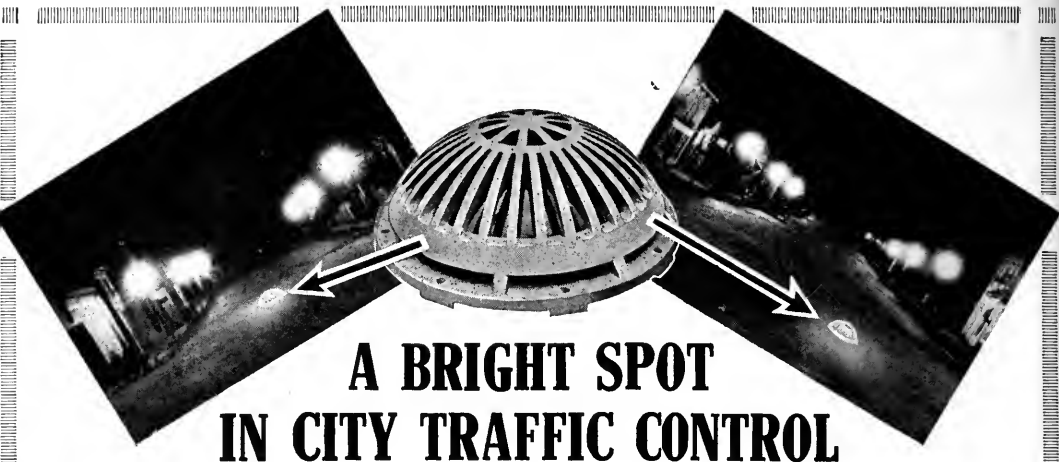
J. R. Fortune, another member of the engineering staff, served as European sales manager of the Murphy Iron Works Company of Detroit, manufacturers of Murphy stokers and furnaces, and was finally called to Detroit to be chief engineer and works manager. From 1915 to 1917 he was engineer-assistant to John Dodge, President of Dodge Brothers, automobile manufacturers. During the war Mr. Fortune served as efficiency engineer at the large gun and shell plant of the American Brake Shoe Company at Erie, Pa.

New Steel and Wire Representative

The American Steel and Wire Company, 208 South La Salle Street, Chicago, Ill., has announced the appointment of E. E. Aldous as representative of the company in the St. Paul-Minneapolis-Duluth territory, with headquarters at St. Paul. Mr. Aldous has been connected with the company for twenty years in different positions, is well posted on the different products of the American Steel and Wire Company, and is eminently qualified to represent it.

Dam and Reservoir Survey

The Holway Engineering Company of Tulsa, Okla., with J. D. Trammell of Fort Worth, Tex., have been engaged as engineers to submit a report and estimate on the cost of a dam and reservoir on Spavinaw Creek and a 65-mile pipe line to furnish a new water-supply for Tulsa, Okla. The survey is already fully under way and progressing rapidly.



A BRIGHT SPOT IN CITY TRAFFIC CONTROL

Furnishing a bright spot without glare for the control of traffic at street crossings, narrow streets, heavy traffic streets and boulevards is the function of the Mushroom Traffic Light. It is readily visible day and night right where the driver is looking. It is accident-proof, indestructible and supplied with a duplex lighting system that insures constant service.

Our descriptive Bulletin sent free on request.

ELECTRICAL AND SPECIALTY SUPPLY CO.
MADISON TERMINAL BUILDING, CHICAGO, ILL.

A Proud City— Beautiful Avenues, Streets and Parks—

Park and shade tree spraying now considered an absolute necessity by the progressive park boards and foresters—nothing is as important—beauty is not possible without pest control.



Shade tree spraying in St. Louis

More prominent cities purchased Bean park sprayers last year than ever before. Many more will buy this year. You owe it to your city to investigate this problem now. The first step is a power sprayer. Send for our literature now. Several new sizes in park sprayers since last year. We have the right size for economy and efficiency for your city.

BEAN SPRAY PUMP CO.
Lansing, Mich. San Jose, Calif.



A WHITE WAY IN CHATTANOOGA, TENN.

illuminating engineers and all interested in the beauty of the city as the most favorable and economic type of standard. Its simplicity lets it blend into the landscape, so that it does not break up the vista in the daytime. At night the single light permits it to send its rays out unimpeded by interfering sources of illumination grouped on the same post. The first installation of the "Unity" standard, made by the Casey-Hedges Co., Chattanooga, Tenn., was at quite a recent date and has been followed by further installations in Baltimore, Md., Rochester, N. Y., Chattanooga, Tenn., and other large cities.

Simplicity in Lighting Standards

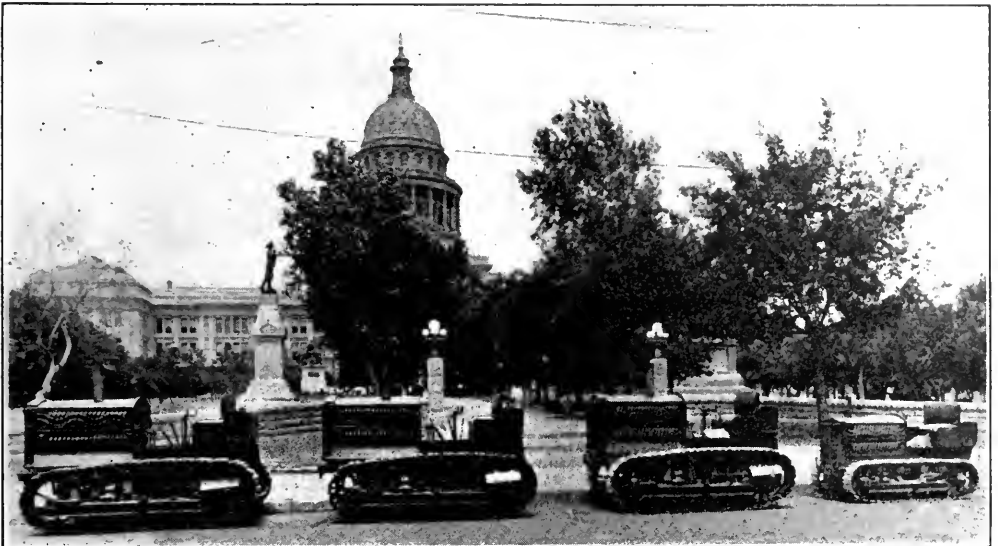
The lighting standard illustrated herewith, on which is mounted a luminous arc lamp, is worthy of study because of its simplicity of design. The standard is made of cast iron, with slightly enlarged base, a fluted column, and urn-shaped capital, on which may be mounted the type of lamp most desired by the community. The freedom from excessive embellishment, the elimination of superfluous tracery, heightens the decorative value of the standard to the community and makes an imposing design.

The single lamp standard has been accepted by city planners, landscape architects, artists,

Recent Purchase of Tractors for County Road Work

The accompanying illustration shows four "Caterpillar" tractors made by the Holt Manufacturing Company of Peoria, Ill., which were recently purchased by the Travis County, Tex., Road Commissioners. The sale, which was made by the Walter Tibbs Company of Austin, Tex., included three 10-ton and one 5-ton Holt tractor.

These tractors were purchased by the County Commissioners after having used three 5-ton "Caterpillar" tractors for about nine months in road work.



THESE HOLT TRACTORS SHOW TRAVIS COUNTY'S DESIRE FOR BETTER ROADS

UNION METAL LAMP STANDARDS

60 Miles of Union Metal Lighting In Greater Cleveland

In the extensive use of Union Metal Lamp Standards, Cleveland and its suburbs are typical of many progressive American cities.

Principal business streets and part of the boulevard system already total 20 miles of intensive white way lighting.

Recent contract for lighting business and residential streets of East Cleveland adds an additional 40 miles of Union Metal ornamental standards.

For ten years Union Metal Lamp Standards in increasing numbers have provided handsome and safe supports for the lighting units that have made Cleveland one of the best lighted cities in the country.

Let us point out "The Right Way for your White Way."

The Union Metal Manufacturing Co.
CANTON, OHIO



Union Metal Residential Standard for East Cleveland.



Well lighted Cleveland Street.



Union Metal White Way Standard for Cleveland.



A COMPLETE ROAD-REPAIR PLANT FOR ASPHALT OR CONCRETE PAVEMENTS

A Complete Asphalt Road Repair Outfit

The need of a single piece of apparatus embodying all of the essential parts needed in asphalt road repair and maintenance brought out the Andresen road repair outfit, made for H. P. Andresen & Company, 1261 North Clark St., Chicago, Ill., by Littleford Bros., 500 East Pearl St., Cincinnati, Ohio. This outfit is primarily intended for the application of bituminous binder in repairing holes when they are small, thus saving money and keeping the road in a proper condition.

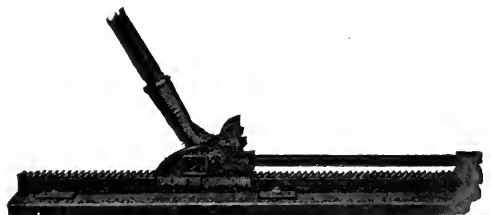
This road repair outfit as illustrated is drawn by a truck or team of horses and carries all necessary material, tools, heating appliances, and three or four men to operate it. Any type of pavement can be repaired—asphalt, bituminous concrete, cement concrete, brick or water-bound and asphalt macadam. It is not necessary to send out rollers, tool heaters, tar kettles, wagons, etc. Neither is an expensive asphalt plant required. Cities having an asphalt plant can do their own repairing of asphalt and other streets with this road repair outfit. Large cities can use it to advantage in connection with their asphalt plants for the patrol system of repairing all types of pavements.

This apparatus combines in a single device a heating or melting kettle, two bins for heating sand and stone, a combination mixing pan and tool carrier, a heater for tampers and smoothers, a coal-burning furnace, a coal bin, a cement bin, space on top of the bins for carrying materials and tools, a hot shelf for keeping pouring pots warm and a driver's seat large enough for 4 men. These parts are compactly mounted on a set of 4 wheels and are

arranged so that the material charged into the wagon at the top is heated and delivered by gravity alone to the mixing pan at the rear. The illustration above shows one of the men opening one of the bin gates for sand or stone or a mixture of both, permitting the material to flow by gravity into the mixing pan. The upper right-hand picture shows a workman adding a measured amount of asphalt to the heated aggregate, and the lower photograph shows the mixing of a bituminous batch by hand with hot shovels removed from the tool heater.

A Pipe-Forcing Jack for Installing Service Lines

A pipe-forcing jack for installing water service lines and small gas pipe has been developed by the Duff Manufacturing Company, 530 Preble Avenue, Pittsburgh, Pa. According to the testimony of J. E. O'Brien Company, of Crookston, Minn., one of the many contractors who are using this jack, it has proved very satisfactory and has saved the expense of trenching and refilling. They found it particularly useful for laying service pipe under pavement, sidewalks or street car tracks. The



DUFF PIPE-FORCING JACK



For Heating and Applying under Pressure all varieties of Bituminous Materials, Hot or Cold, for Road Construction, Maintenance or Dust Laying.

Heat and volume under instant control of operator. Positive pressure produced by the Kinney Pump.

PATENT COMBINATION Auto Heater and Distributor

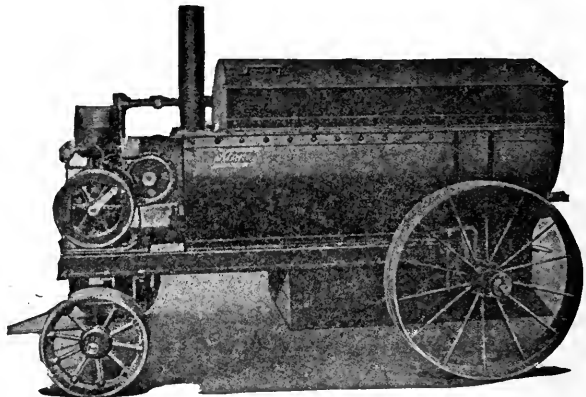


HANDY HEATER and SPRAYER

Especially adapted for Road maintenance, construction and general repair work. Contents constantly agitated while heating.

No burning or coking of material. Pump, Piping, Hose, Nozzles, Automatically Heated.

No Steam Required.



Kinney Manufacturing Company

3529 Washington Street
BOSTON, MASSACHUSETTS

BRANCHES:

NEW YORK

PHILADELPHIA

CHICAGO
SAN FRANCISCO

HOUSTON

KANSAS CITY

method of operation is very simple and for years has proved uniformly successful in all localities where the soil is not too hard or rocky.

The machine consists of a malleable iron cage travelling on a steel track with machine-cut teeth. At the front of the cage is a groove and clamp for holding pipe of $\frac{3}{4}$ to 4 inches in diameter. The rack is provided with bolts for securing it to a plank and also carries two guides for holding the pipe in line. The working parts are drop-forged of steel and heat-

treated to increase their strength and durability. The jack is furnished with a set of hardened couplings to fit pipe from $\frac{3}{4}$ to 4 inches, turned at one end to a cutting edge. They are used as a pilot with a small section of pipe a size larger than the pipe to be laid, to cut through roots or small obstructions.

For operating the machine a trench about 15 feet long is dug, in which to place the jack. The pipe is put in position and forced forward the full length of the rack. The jack is then drawn back to its starting point on the rack, and a new section of pipe is screwed to the first section and forced forward. Pipe may be forced through the soil in this manner for distances of 60 to 300 feet, depending upon the softness of the soil and the size of pipe used. By digging short trenches at suitable distances apart, pipe may be forced through the intervening soil and extensive systems completed in the minimum time at a great saving. This forcing jack is used successfully by municipal departments and gas and water companies, as well as by contractors, for installing small mains and running lines from street mains to consumers' premises.



FORCING 2-INCH GAS PIPE UNDER RAILWAY TRACK IN BACKGROUND—A DISTANCE OF 60 FEET

City Planning Reports

The Technical Advisory Corporation, 132 Nassau St., New York City, has been retained by the City Planning Commission of Cincinnati, Ohio, to make a city planning survey of that city and prepare for the commission a comprehensive report on its findings, together with a program and order of urgency for the guidance of the commission in the preparation of a comprehensive city plan. The present work will be finished in about 5 months, in order that the City Planning Commission may be able to start actively on its program with the beginning of 1922.

At the last meeting of the City Planning Commission it voted to retain the Technical Advisory Corporation to prepare a city plan, a building code and a zoning ordinance. At present this corporation is zoning the following municipalities: Tarrytown, N. Y.; Westfield, N. J.; Roselle Park, N. J.; Elizabeth, N. J.; Orange, N. J.; Caldwell, N. J.; S. Orange, N. J.; W. Orange, N. J., and Rutherford, N. J.

Brockton's Sewage Pumping Station

In the article "Recent Installation of Centrifugal Pumps in Brockton Sewage Pumping Station," which appeared on pages 185-190 of the September issue of *THE AMERICAN CITY*, no mention was made of the fact that the layout, supervision and installation of these centrifugal pumps at the Brockton sewage pumping station were under the direct supervision of Harold S. Crocker, City Engineer of Brockton. Mr. Crocker deserves full credit for the careful design and supervision of the work on this installation.



Winther Trucks please City Officials

With three Winther four-wheel-drives, the city of Madison, Wisconsin, has settled its problems of garbage disposal, to its entire satisfaction.

There is a size and type of Winther rear and four-wheel-drive for every requirement of municipal service. Write us for interesting literature.



There is no more skidding at city corners, no balking in deep snow, no stalling in the soft ground at the city dumps. Winther power on all four wheels takes care of that.

Madison expects uninterrupted hauling service,—and gets it!

The fact that Minneapolis, Sioux City, and other large municipalities depend implicitly upon Winther fleets for garbage disposal is significant. It is convincing proof that these trucks have assumed a leading place in city service.

Let us tell you more about Winther trucks,—the sizes and models that you will find most profitable.

Winther Motors, Inc.
Manufacturers of Motor Trucks and Motor Cars
Kenosha, Wis.

WINTER TRUCKS

What Electrically Operated Valves Are Doing for Buffalo

The discharges from fire pumps at the Colonel Francis G. Ward Station of the Buffalo, N. Y., water-works are connected by hydraulically operated valves with two 60-inch discharge mains, one on the low service and the other on the high. The discharge mains are in turn connected with 36-inch and 48-inch mains so that discharge from either 60-inch main can be put on high or low pressure by operating the necessary valves. By daily operation of these valves, it is possible to utilize a main on Jersey Street alternately for high-pressure service during the hours of peak load and for low pressure the remainder of the day, thus materially reducing the discharge through the 60-inch discharge main on Porter Avenue. In addition, it will allow the maximum output of 150 million gallons per day to be obtained from the Ward Station entirely on the high-pressure system. In order to meet these conditions, it would be necessary either to install a 60-inch main or to operate three 48-inch valves and two 16-inch valves twice a day. This would require the services of a large number of men and considerable time. It was finally decided that an attempt would be made to provide some mechanical operating device, so that these valves may be operated by one man without loss of time. The Dean Control System, manufactured by Payne Dean, Ltd., 103 Park Avenue, New York City, was adopted for the five valves in question, and also for ten similar valves in the Massachusetts Avenue section.

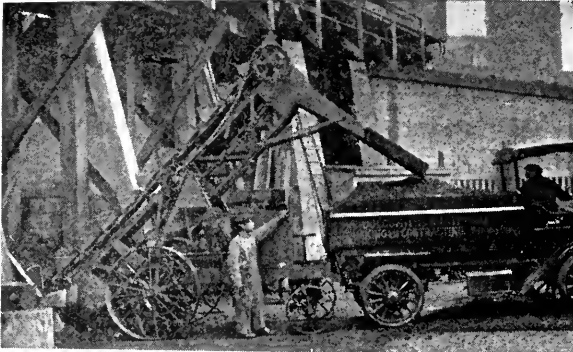
The electrical control system is quite unique, inasmuch as there are two centralized points of control completely controlling five valves on Jersey Street, and the other control station controlling two valves from the Massachusetts Avenue gate keeper's house. The problem of adapting a modern control system to old valves had to be considered, as many of these valves bore no name and no identification mark as to the number of turns required to operate them.

The application of the Dean Control is being made to these valves without shutting down the supply, and during the time of construction the valves may be operated by hand in case of emergency. The location in which the electrical operating device has to work is anything but desirable, since many of the vaults containing the valves are filled or partly filled with water, and, further, the Dean Control units have to withstand the rubbish and water that escape into the vault through the manhole covers. For this reason special attention is given to the design of the units, to make them positively water-proof.

A somewhat similar installation for controlling two 48-inch and one 36-inch valve was recently completed in Cambridge, Mass. These three valves control practically the entire supply system from the main distributing reservoir.



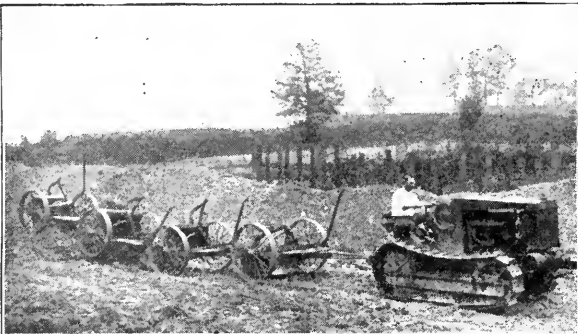
STREET CONTROL BOX AND VENTILATOR FOR VALVE CHAMBER



Consider this saving before you buy a wagon loader

The Haiss Loader is a **one man loader**—no shovellers or trimmers needed. On a 5 yard truck—8 trips-a-day basis, prices 1921 New York,—it will save you nearly \$40.00 a day over hand labor. And it will load faster and more efficiently than the average loader—see those propellers and "crowding gear"—that's part of the reason. Let us tell you about them in detail. Ask us now.

THE GEO. HAISS MFG. CO., Inc.
143rd St. and RIDER AVE. NEW YORK
Established 1892 Representatives throughout the World H-41



ROYRAC

UNIT WHEELERS

are time and money savers, and will increase your daily yardage many times.

Work successfully behind all tractors.

Actual measured capacity 20 cu. ft. By heaping loads 22 cu. ft. can be loaded.

Write for Special Bulletin G118

SMITH & SONS MFG. CO.

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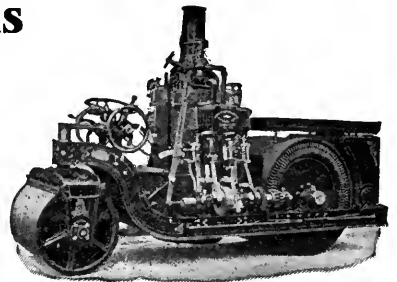
ERIE TANDEM PAVING ROLLERS

Includes everything that makes for the best in Road Rollers. They are strong, simple in construction—durable and economical and easy to operate. Our first roller built in 1887 is still doing its "bit."

Erie Rollers are guaranteed against breakage or wear for 5 years.

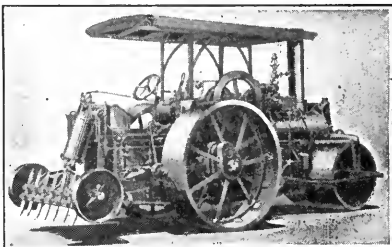
Write for illustrated material.

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ERIE, PA.

QUALITY MACHINERY



With Pressure Cylinder Scarifier

BUFFALO PITTS ROLLERS

Are purchased by Discriminating buyers due to the many years of satisfactory service which they will render, the low repair costs and their general reliability.

**ALL SIZES—ALL TYPES
STEAM AND MOTOR ROLLERS**

Users of Buffalo Pitts and Kelly Springfield Rollers should equip rollers with Pressure Cylinder Scarifiers.

Full information as to cost furnished on request.

**THE BUFFALO-SPRINGFIELD ROLLER COMPANY
SPRINGFIELD, OHIO**

Volume

XXV

Number 6

The American City Magazine

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1921

Reinforced Concrete Reservoir at Perth Amboy, New Jersey

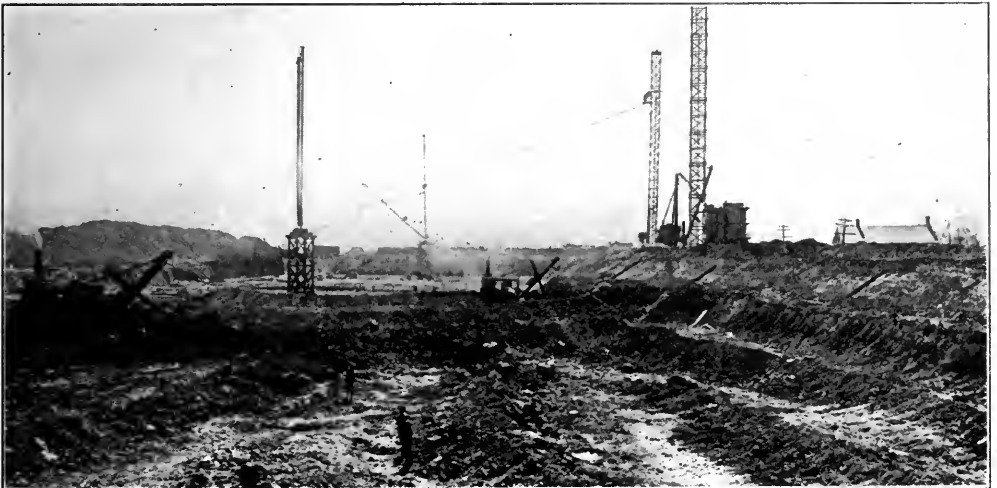
By George A. Johnson

Consulting Engineer, New York City

THE building by the city of Perth Amboy of the first 40,000,000-gallon unit of the proposed 160,000,000-gallon water distributing reservoir was one of the first important steps taken in New Jersey in the line of post-war construction. Perth Amboy is a thriving industrial center of 42,000 population, located in northeastern New Jersey near the mouth of the Raritan River, and a generation ago was one of the important ports of the Atlantic seaboard. In 1900 it had 17,700 inhabitants, consequently in the past 20 years its population has increased by 137 per cent. Its

present water-supply is derived from underground sources at Runyon, south of the Raritan River, and is pumped therefrom to the city through about 9 miles of force mains. The daily consumption averages about 12,000,000 gallons, or 286 gallons per capita.

On August 11, 1917, the writer was engaged to investigate the water problem of Perth Amboy with essential reference to securing additional water from sources other than those then in use. The matter received exhaustive study, the results of which, however, have no particular bearing



EXCAVATION 75 PER CENT COMPLETE FOR THE FIRST UNIT OF THE NEW PERTH AMBOY 160,000,000-GALLON WATER DISTRIBUTING RESERVOIR

on the subject of this article. Suffice it to say that as a part of a comprehensive plan of developing an adequate supply of pure water to meet the needs of this community for a generation to come, one of the first steps in the program was the decision to construct a storage and distributing reservoir on high ground on the outskirts of the city.

The Type of Reservoir Needed

The decision to build a storage and distributing reservoir was based upon the object of meeting satisfactorily a double purpose, namely, to enable the pumps to operate always under a constant head, thereby greatly facilitating their efficient and economical performance, and also to provide an ample reserve supply of water. In figuring the size of this reservoir there were considered, among other things, the standards of the National Board of Fire Underwriters, which specify for such reservoirs in similar circumstances a capacity equal to five days' maximum consumption plus a 10-hour fire flow. For Perth Amboy under these conditions a reservoir capacity of 64,000,000 gallons was needed to meet these requirements at present, and 156,000,000 gallons when the daily consumption should reach 30,000,000 gallons. The prevailing

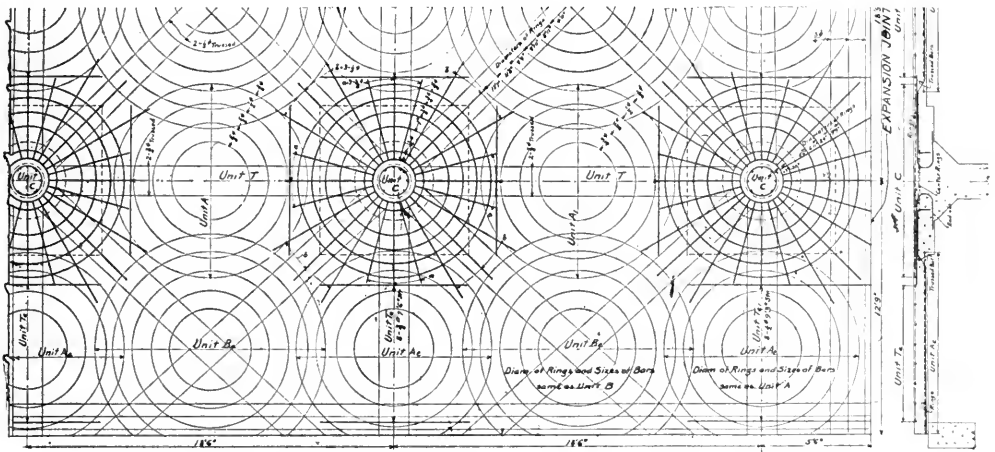
abnormally high prices of labor and materials resulted, however, in a decision to build a reservoir having one-quarter the ultimate capacity, and designs for a 40,000,000-gallon unit were prepared. The site selected for the reservoir was on city property at Kinsey's Corner in the northwest part of the city.

Because of the war it was not until 1920 that bids were requested on this work, and on April 7, 1920, four bids were received, ranging from \$1,095,566 to \$1,205,745.50. The contract was let on April 9, 1920, to the lowest bidder, The Snare & Triest Company (now the Frederick Snare Corporation) of New York, at the bid price of \$1,095,566.

The work involved in this contract comprised a 40,000,000-gallon covered basin, pipe lines connecting it with the existing distribution system, a small high-service pumping station and its connecting pipe lines, and a large drain to remove surface water from the reservoir site and care for a possible overflow. The covered type of reservoir was adopted as representing the best modern practice for service reservoirs located within the municipal limits, in that the hygienic purity and general cleanliness of the water would thus be fully conserved. Ground water, such as the Perth Amboy



EXCAVATION ABOUT 90 PER CENT COMPLETE—RESERVOIR FLOOR WITH PORTION OF REINFORCING IN PLACE READY FOR POURING CONCRETE



CONTRACT PLAN OF REINFORCING FOR RESERVOIR FLOOR, SHOWING VARIOUS UNITS

supply, contains to a relatively high degree those mineral constituents which are particularly favorable to the development of vegetable growths. Such growths develop rapidly on exposure of the water to sunlight, and some of them impart to water very offensive tastes and odors. The organisms which cause such troubles can readily be destroyed by the use of suitable chemical compounds properly applied, but the odor in the water will thereafter persist for days, or even weeks, depending upon the rate of displacement of the water, and other conditions. Furthermore, an open reservoir is always liable to an uncertain degree of air-borne and malicious pollution. Covering the reservoir gives assurance of keeping the water as pure, safe and satisfactory as when it was drawn from the ground.

Design and Dimensions

The completed unit of the reservoir is 900 feet long, at full water level, with a width varying from 230 feet to 370 feet, and has a water depth of 25 feet. Three sides of the reservoir consist of reinforced concrete T-shaped retaining wall 7 feet high, surmounting an embankment built from the excavated material, largely clay. The fourth side of the basin is a self-sustaining concrete wall, which will serve as a dividing wall between this unit and those to be built subsequently. This is of reinforced concrete, T-shape, 25.25 feet high with a 20-foot base. The roof is a flat slab of reinforced concrete, without beams, carried on concrete columns; the floor slab is

similar. The inside of the basin is lined with concrete. Nearly all of the concrete except the slope lining is reinforced. The earth embankments are carried up over the walls, and the roof is covered with 2.25 feet of earth. The types of construction and the proportions adopted were the result of a series of painstaking studies of relative cost covering not only the first unit, but also the ultimate reservoir.

The feature of the reservoir is the design of the bottom and top slabs. Flat slab construction was used both in the floor and in the roof. The reinforcement used was the Smulski system, consisting of a combination of rings and radials. This system was chosen because of economy. The total area of flat slab construction was about 500,000 square feet.

As evident from the plan, the basin is provided with three construction joints which separate the floor and roof into four parts of almost equal lengths. The typical panels are 18.5 feet square, except that at the wall the span is shortened to 15.67 feet to compensate for the fact that at the wall the slab is freely supported. At the expansion joints the slab is provided with a 5.5 foot overhang, designed as cantilevers, so that the spans across the joints are 11 feet center to center.

The roof slab is 8 inches thick, the drop panel at the column 7.5 feet square and 4 inches thick. The 20-inch columns are reinforced with eight $\frac{3}{4}$ -inch round bars and $\frac{3}{8}$ hoops, and 4-foot column heads are used. The bottom of the reservoir is of an in-



VIEW OF RESERVOIR FLOOR COMPLETED, WITH REINFORCING RODS PROJECTING FOR BONDING WITH COLUMNS—FIRST SECTION OF FORMS READY FOR ROOF

verted flat slab design, computed to withstand uniformly distributed reaction. The drop panels, however, are placed below the slab and are formed in the soil. In place of column heads, equivalent column pedestals are used. The total thickness at the column is larger than for the roof, so as to provide additional cover for the bottom reinforcement.

The reinforcement of slabs is proportioned for a load of 300 pounds per square foot. The bottom reinforcement consists of Units A between the columns composed of four rings ranging in diameter from 3.75 to 9.75 feet, and two trussed bars carried near the top of the slab across the columns beyond the points of inflection of the adjoining panels. The central part is reinforced by Unit B with six rings ranging in diameter from 3.75 to 13.75 feet, and four diagonal trussed bars, two in each diagonal direction, which are bent up in the column section and hooked to a ring placed within the column head. The negative bending moment reinforcement at the column, Unit C, consists of five rings, one of which is placed within the column head. The diameter of the outside ring ranges from 5.5 to 9.75 feet. Additional negative reinforcement is used across Units A and consists of straight bars. It should be noted

that the diameters of the rings are such that the various units overlap, forming in effect a continuous mat of steel. The reinforcement in the floor is placed in an inverted position, positive steel being placed near the top of the slab, and negative steel near the bottom. By the use of the rings considerable economy in steel is effected without reducing the strength of the construction.

Bending the Reinforcement

All the bending of the reinforcement, including the rings, was done on the job. For bending the rings an old tire bender was used which the contractor discovered among his discarded tools. This was run by a gasoline engine. The tire bender was of a simple design. It consisted of three rollers placed in a cast frame, two at the bottom and the third above. The top and one bottom roller were geared together and revolved by power. The other bottom roller could be adjusted to give the proper diameter to the circle. The process of rolling was simple. A bar was inserted between the rollers, the motion of which moved the bar, at the same time giving it the desired curvature. The distance between the movable roller and the top roller governed the diameter of the ring. The speed of the

rolling depended upon the speed of revolution of the roller. By observation it was found that five rings of average diameter were bent in two minutes. This, of course, represents only the time of actual bending, and could not be maintained during an entire day. The bending machine was operated by two men, one feeding the bars and the other removing the completed rings. The bender was placed conveniently near the pile of materials, to reduce as much as possible the cost of handling.

It may be added that it was not necessary to adjust the roller for every change in diameter of rings. A bar bent to any curvature after being wired at the end adopts the curvature of the ring of a diameter corresponding to its length.

Of interest may be the method of placing the reinforcement. This was accomplished with considerable speed, although this was the first job on which the contractor had placed the system. Ordinarily the trussed bars were placed first and tied at the column. This gave a good support for the rings in Unit C, which were placed next. The rings in Units A and B were placed

last to prevent their being disturbed by walking on them. When wired together, the steel at the column was rigid and kept well its position above the form during concreting.

The formwork for the flat slab was built in towers, one tower for each panel. The portion between the columns was hinged in such a way that forward movement of the towers was possible. Sufficient formwork for one section was provided. Concreting was started near the adjoining section, and as soon as the concrete had hardened sufficiently, the form was advanced to the other section. The towers were thus used four times.

It may be mentioned in passing that the George A. Johnson Company has applied the same system of reinforcement in the design of the new water filtration plant for Cambridge, Mass., construction work on which is about one-half completed at this date. The Perth Amboy reservoir was completed and placed in service on July 4, 1921, fifteen months after the contract was awarded.

ACKNOWLEDGMENT.—The photographs used in this article were furnished by the courtesy of the Frederick Snare Corporation.

Problems in Road Building Caused by Heavy Rains

During July and August, cloud-bursts, which are practically very heavy thunderstorms, cause serious problems in road construction in Nevada and Utah. The Bureau of Public Roads of the United States Department of Agriculture has worked out several effective methods of protecting roads from these immense sudden flows of water after long dry spells. Where the drainage channels are well defined no great difficulty is involved in the design of the road drainage structures; but where the flood spreads out over a delta or a valley it is a problem so to locate the line and drainage structures that the latter will save the road from destruction.

In sections where the flood tends to spread out, a wide berm on each side of the roadway makes a substantial protection. The borrow-pit provides material for the embankment and serves as a diversion drain. Sometimes a short concrete dip is used for the purpose of passing the water

over the road in a comparatively wide and shallow flow instead of under it. A dip is simply a pavement extending the full width of the roadway and protected at each edge against undermining by a cut-off wall extending 18 inches below the bottom of the pavement. Instead of attempting to build up a grade for this pavement, so as to raise it above the flood water, the dip follows the grade of the wash, and the water passes over it in time of flood. Where the deltas are so wide and the country so undeveloped as to make the cost of a concrete dip excessive, the dips are surfaced with gravel and the downstream edge is protected by a concrete cut-off wall. In connection with these drainage dips a V-shaped system of dikes and ditches is used, converging toward the road if it is desired to lead the flow from two or more washes to a single dip, and diverging toward the road when it is better to split the flow of a single stream to more than one dip.

The Remarkable Spread of Zoning in American Cities

THE following list of zoning ordinances is based on three other lists prepared respectively by Charles H. Cheney for the National City Planning Conference in 1921, by T. L. Hinckley for the use of the American City Bureau, and by Charles S. Ball, the last-named having been printed in the Chicago City Club *Bulletin* of September 19, 1921. The composite list has further had the benefit of the scrutiny of Messrs. Harland Bartholomew, Edward H. Bennett, Arthur C. Comey, Edward E. Christopher, C. F. Fisher, George B. Ford, John P. Fox, B. Antrim Haldeman, George E. Kessler, John Nolen, Herbert S. Swan, Robert H.

Whitten, and Frank B. Williams, all of whom are professionally active in, and familiar with, recent development. The ordinances cited have been divided according to their content into two groups: *comprehensive*, and *partial*, rather than according to their present status as adopted or in process. Corrections or additions to this list are invited.

TABLE OF ABBREVIATIONS

p z ord.	= partial zoning ordinances
p z reg.	= partial zoning regulations (as in building codes, etc.).
H	= height regulations in zoning ordinances
U	= use regulations in zoning ordinances
A	= area regulations in zoning ordinances
B L	= limitations as to building lines
A p F	= required area per family

I. COMPREHENSIVE ZONING ORDINANCES IN FORCE OR IN PREPARATION, I. E., ALL ZONING ORDINANCES SO FAR REPORTED TO THE AMERICAN CITY THAT ARE CITY-WIDE IN EXTENT WITH BASIC HEIGHT, USE AND AREA REGULATIONS

State	City	Character of Zone Ordinance	Consultant and Status of Ordinance (Date alone = adopted)
California	Alameda	H, U, A, ord.	C. H. Cheney —2/16/19
Zoning Act	Palo Alto	H, U, A, ord.	C. H. Cheney —8/16/18
C. P. Act	Paso Robles	H, U, A	C. H. Cheney —in process
District of Columbia	Washington	H, U, A	H. Bartholomew —9/30/20
Zoning Act	Atlanta	H, U, A, B L, A p F proposed	R. H. Whitten —in process
Georgia	Chicago	H, U, A, B L, A p F, proposed	E. H. Bennett —in process
Illinois	Glencoe	H, U, A, A p F	G. W. Maher —5/9/21
Zoning Act 1919, '21	Evanston	H, U, A, A p F, ord.	H. Bartholomew —1/18/21
C. P. Act	Oak Park	H, U, A, A p F	—10/10/21
State Plan	Winnetka	H, U, A, A p F, proposed	H. Bartholomew —in process
Commission Act	Elkhart	H, U, A, B L, proposed	J. Nolen —in process
Indiana			
Zoning Act			
C. P. Act			
Iowa			
Zoning Act			
Kansas	Hutchinson	H, U, A, B L, proposed	H. Bartholomew —in process
Zoning Act	Topeka	H, U, A, B L, proposed	H. Bartholomew —in process
C. P. Act	Wichita	H, U, A, B L, proposed	H. Bartholomew —in process
Maryland	Baltimore	p z reg. H, U, A, proposed	J. C. Grinnalds —in process
Massachusetts			
Zoning Act	Brockton	H, U, A, ord.	A. C. Comey —11/29/20
C. P. Act	Brookline	H, U, A, proposed	A. C. Comey —in process
	Cambridge	H, U, A, proposed	A. C. Comey —in process
	Fall River	H, U, A, proposed	J. P. Fox —in process
	Newton	H, U, A, proposed	J. P. Fox —in process
	Springfield	H, U, A, B L, proposed	Tech. Adv. Corp. —in process
	Worcester	H, U, A, B L, proposed	Tech. Adv. Corp. —in process
Michigan			
Zoning Act	Detroit	H, U, A, B L, proposed	H. Bartholomew —in process
C. P. Act	Flint	H, U, A, B L, proposed	J. Nolen —in process
	Grand Rapids	H, U, A, B L, proposed	H. Bartholomew —in process
	Jackson	H, U, A, A p F, proposed	H. Bartholomew —in process
	Lansing	H, U, A, A p F, proposed	H. Bartholomew —in process
Minnesota			
Zoning Act	St. Paul	H, U, A, B L	E. H. Bennett and W. E. Parsons —in process
C. P. Act			
Missouri			
Zoning Act	St. Louis	H, U, A, ord.	H. Bartholomew —7/15/18
	University City	H, U, A, B L, proposed	H. Bartholomew —in process
Nebraska			
Zoning Act	Lincoln	H, U, A, B L, A p F, proposed	Tech. Adv. Corp. —in process
C. P. Act	Omaha	H, U, A, ord.	H. Bartholomew —6/29/20
New Jersey			
Zoning Act	Bogota	H, U, A, B L, A p F, proposed	H. S. Swan —in process
C. P. Act	Bound Brook	H, U, A, B L, A p F, ord.	H. S. Swan —10/14/21
	Caldwell	H, U, A, B L, ord.	Tech. Adv. Corp. —9/19/21
	Cliffside Park	H, U, A, B L, A p F, ord.	H. S. Swan —9/27/20
	Cranford	H, U, A, B L, proposed	Tech. Adv. Corp. —in process

State	City	Character of Zone Ordinance	Consultant and Status of Ordinance (Date alone = adopted)
New Jersey (Continued)			
	East Orange	H, U, A, B L, ord.	Tech. Adv. Corp. —3/15/21
	Elizabeth	H, U, A, B L, proposed	Tech. Adv. Corp. —in process
	Glen Ridge	H, U, A, B L, ord.	H. S. Swan —6/13/21
	Hoboken	H, U, A, B L, A p F, proposed	H. S. Swan —in process
	Irvington	H, U, A, B L, A p F, proposed	H. S. Swan —in process
	Nutley	H, U, A, B L, A p F, ord., prop.	Tech. Adv. Corp. —11/17/21
	Kearney	H, U, A, B L, proposed	Tech. Adv. Corp. —in process
	Montclair	H, U, A, B L, A p F ord.	H. S. Swan —5/19/21
	Newark	H, U, A, B L, A p F ord.	H. S. Swan —1/3/20
	Orange	H, U, A, B L, proposed	Tech. Adv. Corp. —in process
	Passaic	H, U, A, B L, ord.	Tech. Adv. Corp. —in process
	Paterson	H, U, A, B L, A p F	H. S. Swan —11/1921
	Roselle	H, U, A, B L, proposed	Tech. Adv. Corp. —in process
	Roselle Park	H, U, A, B L, ord.	Tech. Adv. Corp. —11/1/21
	Rutherford	H, U, A, B L, proposed	Tech. Adv. Corp. —in process
	South Orange	H, U, A, B L, proposed (temporary ord. held invalid)	Tech. Adv. Corp. —in process
	Summit	H, U, A, B L, proposed	Tech. Adv. Corp. —in process
	Westfield	H, U, A, B L, ord.	Tech. Adv. Corp. —8/1921
	West Hoboken	H, U, A, B L, proposed	Tech. Adv. Corp. —in process
	West Orange	H, U, A, B L, ord.	Tech. Adv. Corp. —9/1921
New York			
Zoning Act C. P. Act	Brouxville	H, U, A, B L, proposed	Tech. Adv. Corp. —in process
	Mt. Vernon	H, U, A, B L, proposed	Tech. Adv. Corp. —in process
	New York City	H, U, A, ord.	—7/5/16
	Niagara Falls	H, U, A, B L, ord.	J. Nolen —1920
	Rochester	U, ord. 9/22/19 H & A, prop.	E. E. Fisher and B. A. Haldeman —in process
	Tarrytown	H, U, A, B L, proposed	Tech. Adv. Corp. —in process
	Troy	H, U, A, B L, A p F, proposed	H. S. Swan —in process
	White Plains	H, U, A, B L, A p F, ord.	H. S. Swan —6/7/20
	Yonkers	H, U, A, B L, A p F, ord.	H. S. Swan —7/29/20
Ohio			
Zoning Act C. P. Act	Akron	H, U, A, B L, A p F, proposed	J. Nolen 1917 and C. F. Fisher —in process
	Cincinnati	p z reg. H, U, A, B L, proposed	Tech. Adv. Corp. —in process
	Cleveland	H, U, A, A p F, proposed	R. H. Whitten —in process
	Cleveland Hts.	H, U, A, A p F, ord.	R. H. Whitten —8/2/21
	Hamilton	H, U, A, A p F, proposed	H. Bartholomew —in process
	Lakewood	H, U, A, B L, A p F, proposed	R. H. Whitten —in process
	Mansfield	H, U, A, B L, proposed	Tech. Adv. Corp. —in process
Oregon			
Zoning Act C. P. Act	Portland	p z reg. H, U, A, proposed	C. H. Cheney —in process Ord. failed on ref. 1920.
Pennsylvania			
Zoning Act C. P. Act	Philadelphia	H, U, A, B L, A p F, proposed	In council —in process
	Pittsburgh	H, U, A, A p F, proposed	H. Bartholomew —in process
Rhode Island			
Zoning Act			
Tennessee			
Zoning Act C. P. Act	Memphis	H, U, A, B L, proposed	H. Bartholomew —in process
Texas			
Zoning Act Zoning Act	Dallas	H, U, A, B L, A p F, proposed	R. H. Whitten —in process
Washington			
	Seattle	p z reg. H, U, A, A p F, prop.	H. Bartholomew —in process
	Spokane	p z reg. H, U, A, proposed	C. H. Cheney —in process
Wisconsin			
Zoning Act C. P. Act	Green Bay	H, U, A, B L, proposed	J. Nolen —in process
	Janesville	H, U, A, B L, proposed	J. Nolen —in process
	La Crosse	H, U, A, B L, proposed	J. Nolen —in process
	Madison	H, U, A	H. Bartholomew —in process
	Milwaukee	H, U, A, A p F	A. C. Comey —11/15/20

II. REPORTED ZONING ORDINANCES, PARTIAL ZONING REGULATIONS CONTAINING HEIGHT, OR USE, OR AREA REGULATIONS ONLY, OR COVERING ONLY PART OF THE CITY'S AREA, OR EMBODIED IN TENEMENT HOUSE LAWS OR BUILDING CODES, OR OTHERWISE NOT CLASSIFIABLE AS COMPREHENSIVE

State	City	Character of Zone Ordinance	Consultant and Status of Ordinance (Date alone = adopted)
Alabama	Birmingham	p z ord.	
Arkansas	Little Rock	p z ord.	
Arizona	Phoenix		E. H. Bennett and W. E. Parsons —in process
California	Berkeley	U and p z ord.	C. H. Cheney —4/30/20
Zoning Act C. P. Act	Coronado	U ord.	—2/19/21
	Fresno	p z ord.	

State	City	Character of Zone Ordinance	Consultant and Status of Ordinance (Date a'one = adopted)
California (Continued)			
	Long Beach	p z in charter (industrial dis.)	C. H. Cheney —in process
	Los Angeles	U (19 classes)	4/5/20 & 10/19/21
	Modesto	p z ord.	
	Oakland	U ord. and p z reg.	4/1919
	Pasadena	U ord.	10/1/19
	Pomona	p z ord.	3/1917 and 4/1920
	Sacramento	U ord. B L	J. Nolen —6/12/17 10/9/19
	San Francisco	U ord.	—10/3/21 5/1920
	Santa Barbara	p z ord.	
	Sierre Madre	p z reg.	
	South Pasadena	p z reg.	9/1920
	Turlock	p z reg.	C. H. Cheney 1918
Connecticut	Bridgeport	U, B, L, proposed	J. Nolen —1915 (quiescent)
Illinois	River Forest	Details lacking	—in process
Zoning Act	Rock Island		E. H. Bennett and W. E. Parsons
C. P. Act	Wilmette		—in process
Indiana	Gary		E. H. Bennett and W. E. Parsons —in process
Zoning Act			
C. P. Act			
Iowa	Davenport	p z ord.	
Zoning Act	Des Moines	p z ord.	
Kansas	Kansas City		G. E. Kessler —in process
Zoning Act			
C. P. Act			
Massachusetts	Amherst	details lacking	—in process
Zoning Act	Attleboro	details lacking	—in process
C. P. Act	Boston	p z ord.	
	Everett	details lacking	—in process
	Framingham	details lacking	—in process
	Holyoke	details lacking	—in process
	Malden	details lacking	—in process
	Northampton	details lacking	—in process
	Stoneham	details lacking	—in process
	Winchester	details lacking	—in process
Michigan			
Zoning Act			
C. P. Act			
Minnesota	Minneapolis	p z ord. H	—1920
Zoning Act			
C. P. Act			
Missouri	Kansas City		G. E. Kessler —in process
Zoning Act			
Nebraska	Lincoln	details lacking	—in process
New Jersey	Maplewood	U ord.	F. B. Williams and J. P. Fox —1921
Zoning Act			
C. P. Act	Rahway	U ord.	8/11/20
New York	Buffalo		G. H. Norton —in process
Zoning Act	Syracuse	details lacking	—in process
C. P. Act	Utica	p z ord.	
Ohio	East Cleveland	U, B L, Ord.	C. M. Osborne —1919
Zoning Act			—in process
C. P. Act	Toledo		—in process
Oklahoma	Norman	p z reg.	G. E. Kessler —in process
	Oklahoma City		
Tennessee			
Zoning Act			
C. P. Act			
Texas	El Paso	p z ord.	
Zoning Act	Wichita Falls		G. E. Kessler —in process
Virginia	Richmond	p z reg.	
Washington	Tacoma	U ord.	6/14/19
Wisconsin	Amherst	details lacking	—in process
Zoning Act	Racine	U ord.	10/3/16
C. P. Act			

A Survey of the Salaries of Police and Police Departments*

By Lucius H. Cannon

Librarian, Municipal Reference Library, St. Louis, Mo.

THE police, as a governmental function, is one of the first to be actively called to service after the organization of government. And now after five years of mounting costs of living this important function is among the last to receive salary increases at all commensurate with the living needs of its individual members. It is not at all unreasonable or strange that there has been great restlessness, with continued resignations, annual petitions to municipal councils and state legislatures for increased pay—and even strikes—among these underpaid officials.

This survey was made and the result tabulated as concisely as possible, to show in juxtaposition what the larger cities are paying the employes of this department of city or state. The table accompanying the article was already too large, so it became necessary to omit many salaries that for still more extended comparison it might have been interesting to include. But for information and comparison many of the omissions in the tabulation, in offices, salaries and municipalities, are contained in the text. In the case of Newark older data (of 1920) have been added.

In San Francisco an amendment to the charter was submitted to the qualified voters of the city and county, increasing the salaries of all members of the department \$30 a month beginning July 1, 1921. The annual salary of the Chief of Police is increased \$2,000; Captain of Detectives, \$1,000; Detective Sergeants' salaries are to be increased \$40 per month.

The salaries of the Rochester police force were fixed January 31, 1921. The salaries in the table under Seattle include a raise of \$5 to \$10 a month, granted the Police Department January 1, 1921, in accordance with a graduated scale agreed upon by the City Council some time ago. In Baltimore the salaries, with some exceptions, are paid weekly.

The Legislature of Missouri, during the session just closed, after slight adjustment

by the St. Louis Board of Estimate and Apportionment, granted the police officials the following increased salaries:

Chief, \$5,000; Assistant Chief, \$3,800; Secretary to Chief, \$2,300; Chief Detective, \$3,800; Assistant Chief Detective, \$2,400; Inspector, \$2,660; Secretary of the Board of Police Commissioners, \$2,565; Captains, \$2,565; Lieutenants, \$2,380; Superintendent of Bertillon, \$2,280; Sergeants, Detectives, Drillmaster, \$2,000; Patrolmen, \$1,680; Probationary Patrolmen, \$1,380; Turnkeys, \$1,320.

Bonuses

The smallest salary paid patrolmen in 70 of the larger cities of the United States is in Harrisburg, Pa. (Population, 75,917.) The patrolmen receive \$750 a year (August, 1920). The next lowest salaried patrolmen, at \$1,200 for the first year, are those of Buffalo, Birmingham, Paterson, Scranton, Nashville, New Orleans and St. Louis. The only two cities reporting a bonus were Philadelphia and Buffalo. In Philadelphia bonuses are received according to the following percentages of salaries: 20 per cent on salaries up to \$1,500; 15 per cent on salaries from \$1,500 to \$2,000; 10 per cent on salaries over \$2,000 up to \$4,000. The patrolmen receive \$5 a day. There are 68 City Hall guards who were made patrolmen. On October 1, 1919, a bonus of \$300 was added to the salary of every member and employe of the Buffalo force, except the Chief.

Duties of Patrolmen

Patrolmen are assigned to many and various duties besides that of patrolling the streets. In Chicago, Cincinnati, Washington, and a few other cities not reported, they are detailed as chauffeurs. In Washington, D. C., 20 of the 829 patrolmen are drivers, privates (chauffeurs) appointed at \$1,580, but can get no higher rating than private or patrolmen, class No. 2, at \$1,680. They possess all the powers of the regular policemen. The chauffeurs, by the way, re-

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**SALARIES OF THE OFFICIALS OF THE POLICE DEPARTMENT
ANNUAL**

No.	City	Popula- tion	City Area. Sq. Miles	Commissioner, Chief, Marshal, Superintendent	Secretary	Inspector of Police	Captains	Lts	Drill Master
8	Baltimore, Md.....	733,826	92	Com. \$10,000 Mar. 4,000 Dep. 3,500	\$3,500 2,300		\$3,120 2,600	\$2,236	\$2,236
7	Boston, Mass.....	748,060	43	Dep. 7,000 4,000	2,500	3,800 Asst. 2,500	3,500	2,500	3,500
12	Buffalo, N. Y.....	506,775	42	5,500	1,620 to 1,740	2,340 2,472	2,040 to 2,280	1,740 to 1,800	
2	Chicago, Ill.....	2,701,705	307	Asst. 8,000 6,000	3,180		3,500	2,700	3,090
16	Cincinnati, O.....	401,247	72	Asst. 6,000 3,200	1,900	2,700		2000	Inspector
5	Cleveland, O.....	796,836	56	Asst. 5,500 3,740	2,288	2,190	2,981	2,288	2,981
28	Columbus, O.....	237,031	22	3,050	2,065		2,200	2040	Dec. 1,790
25	Denver, Colo.....	256,369	54	Asst. 3,600 2,700	1,860		2,400		
4	Detroit, Mich.....	993,739	76	Asst. 6,000 4,500		Chief 4,000 3,000	2,750	2,600	
21	Indianapolis, Ind.....	314,194	42	4,000	1,500	2,520	2,220	1,920	
22	Jersey City, N.J.....	297,864	20	5,500	3,000	4,600	3,600	2,700	2,300
19	Kansas City, Mo.....	324,410	60	5,000	1,800		2,400	1,800	1800
10	Los Angeles, Calif.....	576,673	340	3,600	2,700		3,000	2,400 2,700	2,400
29	Louisville, Ky.....	234,891	25	Asst. 4,000 2,000	1,800		1,800	1,642	
13	Milwaukee, Wis.....	457,147	26	5,500	2,700	3,420		2,640	
18	Minneapolis, Minn.....	380,582	54	Asst. 4,560 3,230	2,360		2,400	2,280	
17	New Orleans, La.....	387,219	265	5,000	4,375		4,375	Corporals 1,575	
1	New York, N. Y.....	5,621,151	319	Dep. 7,500 6,500		7,500	4,000	3,300	
15	Newark, N. J.....	414,216	23	5,400			3,400	2,600	
3	Philadelphia, Pa.....	1,823,158	129	Asst. 5,000 4,000	2,400		2,550	2,300	1,900
9	Pittsburgh, Pa.....	588,193	42						
24	Portland, Ore.....	258,288	66	3,420			2,580	2,160	
27	Providence, R. I.....	237,595	18	3,977			2,511	2,098	
23	Rochester, N. Y.....	295,750	32	Dep. 4,200 3,300		2,800	2,500	2,300	
6	St. Louis, Mo.....	772,897	62	Asst. 5,000 3,800	2,000	2,500	2,400	2,100	1,800
30	St. Paul, Minn.....	234,595	55	4,000			2,400	1,800	
11	San Francisco, Calif.....	508,410	44	Asst. 3,976 2,616			2,616	2,136	
20	Seattle, Wash.....	315,652	56	4,800	3,120	3,120	2,760	2,460	
26	Toledo, O.....	243,109	32	3,500	2,400	2,700	2,400	2,200	
14	Washington, D. C.....	437,571	70	4,500	2,040	2,520	2,520	2,120	

OF THE LARGER CITIES OF THE UNITED STATES

SALARIES

Sergeants		Patrolmen			Turn- keys	Chief Detective	Supt. Bertillon System	Women		Per Capita Cost of Depart- ment*
Precinct or Road	Detective	Probation- ary or Min- imum	Annual Increase	Maxi- mum				Police	Matrons	
\$1,768	\$1,976	\$1,300	\$130	\$1,560	\$1,560	\$3,120	\$2,444	\$1,200	\$1,300	\$2.20
	2,300	1,400	100	1,800		3,800 Asst. 3,500			620. to \$1,500	3.49
2,040 to 2,280		1,200	60 to 120	1,500		2,520 2,760	1,620 to 1,100	960 to 1,200	780. to 900	2.98
2,400	2,100	1,640		2,000	Patrol- men	4,000 3,400	3,500	1,640	1,344	2.94
	1,700	1,200		1,500		2,500 2,100	2,500			2.23
2,172		1,700		2,004	1,700	3,190 Asst. 2,981	2,981		1,215	1.83
1,920		1,580		1,680		Lt. 1,790		1,680	1,500	1.24
	1,860	1,440		1,620	1,860	2,400	1,800	1,500	1,500	1.13
2,350	2,400	1,900		2,160		4,500 Asst. 3,500			1,560	3.37
	\$5. per day	\$4. per day		\$4.50 per day		2,520 Capt. 2,220	\$5. per day			1.93
2,500	2,450	1,700		2,000					1,200	2.98
1,500	1,800	1,080		1,380	1,200	3,600	1,800		1,200	2.15
2,100	2,400	1,440	120	1,800		3,300	2,400	1,440 to	1,800	1.91
1,551				1,460		1,800	1,440			1.96
	2,140	1,740	60	1,860		3,140 Dec. 2,340			1,320	1.70
2,160	2,400	1,740		2,040	2,040	3,060	2,460	2,040	2,040	1.21
		1,200	150	1,500		1,872				1.25
	2,700	1,769	to	2,280		1st Gra. 3,300		1,769 to	2,280	3.13
	2,300	1,800	to	2,000						2.81
1,950	2,050			\$5. per day		2,790		780.	1,000	2.91
										1.90
1,980		1,620	to	1,860		3,120		1,536		1.17
1,825	1,825	1,260	to	1,686		2,787		1,375		2.33
2,000 to	2,450	1,500	to	1,800		2,800	1,500	1,800	1,325	2.10
1,800	1,800	1,200		1,500	1,200	3,500 Asst. 2,100	2,100	900 to 1,080	900. to 960.	3.03 3.76 4.16
1,680	1,800	1,380		1,560		2,400		1,200 to	1,380	1.57
1,896	1,896	1,680		1,680	1,60	2,976		1,680 to	1,500	3.28
2,100	2,220	1,740	to	1,980		3,120		1,800	1,800	1.51
2,100	2,220	1,500		1,800		2,700	2,610	1,200	1,440	1.35
1,920	2,260	1,580	100	1,780	1,900	2,800 Asst. 2,520		1,580 to 1,780	960.	2.79

* Financial Statistics of Cities, 1918. Census Bureau, Washington, 1919.

ceive \$1,200 in Kansas City, Mo.; \$1,680 in San Francisco; \$2,040 in Minneapolis. Patrolmen are also detailed as turnkeys in Chicago; as machinists, multigraph operators, stenographers, typists, chief record clerk in Cleveland.

Various Employees

The operators of the telephone and switchboard receive salaries that widely vary. Kansas City, Mo., pays \$1,200; San Francisco, \$1,500, and Minneapolis, \$2,040. The photographer in Philadelphia receives \$2,500 and serves also as a detective. His assistant receives \$1,300. The photographer of the San Francisco department receives \$2,400, and of Seattle, \$1,800. Stenographers receive \$1,560 in Minneapolis, \$2,250 in New Orleans, \$1,800 for assistant, and in San Francisco, \$3,000 and \$2,400 for assistant. The elevator man receives \$2,000 in Jersey City, N. J. The chief cook of the Police Department of Seattle receives \$2,040; assistants, \$1,860.

The hostlers receive widely varying salaries. In Louisville they receive \$3.50 a day; in Philadelphia, \$900 a year; in Kansas City, Mo., \$1,200; San Francisco, \$1,620, and in Jersey City they receive \$2,450 a year.

Only one bandmaster was reported, that of Philadelphia. Whether or not this is an innovation, it is highly commendable and ought to be followed in all cities. His salary is \$1,800.

Vacations

In the matter of annual vacations with full pay, the cities very generally grant them, and only New Haven, Conn., and St. Louis, of all those reporting, allow none. In the case of St. Louis the state has control over the Police Department, which is under the immediate jurisdiction of a Board of Police Commissioners, appointed by the Governor of the state. The state law does not give the police force a vacation, but the Board of Commissioners allows two days a month during the year. Baltimore allows 30 days; Providence, 24 days; Detroit and Washington, 20 days; New York, 18 days; Minneapolis, 17 days. Fifteen days are allowed in the following cities: Chicago, Los Angeles, Cincinnati, Jersey City, Portland, Ore., San Francisco, San Diego, Louisville, St. Paul. Each member of the department in Seattle is allowed 1

day off duty in every 8, and 15 days' vacation. The following cities allow 14 days: Boston, Buffalo, Philadelphia, Denver, Rochester, Springfield, Mass. Cleveland allows 12 days; Houston, Savannah, Little Rock, Birmingham, Columbus, Ohio, 10 days; Dallas, Hartford, Conn., Indianapolis, 7 days. Sick leave is closely related to vacations. Full pay is allowed in cases of illness in the following cities: Baltimore, Chicago, Cleveland, St. Louis, San Francisco, Detroit, Washington, D. C., Louisville, Indianapolis, Richmond, Norfolk, Salt Lake City and Lincoln. Los Angeles allows 12 days annually for sickness. Half-pay is granted in New York, Boston, Portland, Ore., Buffalo, Cambridge, Worcester, Birmingham and Denver. Pay is docked during sickness in the following cities: Cincinnati, Minneapolis, Omaha, San Diego, New Haven, Springfield, Mass., and Providence.

Crime waves, the aftermath of war, may have increased the hours of labor in the police departments of many cities. But during normal times and up to quite recently, nearly all the cities have 8 hours as a day's labor for the police departments. Lincoln, Nebr., has 12 hours. Baltimore, Akron, Harrisburg and New Haven have 10 hours, Louisville 9½ hours, and Little Rock 8 hours and 40 minutes.

All members of the regular force in New Orleans are under civil service, with the exception of matrons, protection officer, inspector of moving pictures, stenographers and messengers. All original appointments to the regular force are made by the Superintendent of Police from the eligible list furnished by the Civil Service Board. The Superintendent is also responsible for all promotions, trials, punishments and removals.

Baltimore referred to its pension fund. The beneficiaries are those who have paid in 2 per cent of their salaries for a period of years. After 16 years' service, if physically disqualified, the patrolman is laid off on half-pay for life. If a patrolman is physically disabled in the performance of his duties prior to the service of 16 years, he may be retired by the Commissioner. Should disability arise outside of the line of duty, the Police Commissioner may retire him with a gratuity of not more than one year's pay.

Paving Street Railway Areas and Heavy-Traffic Streets

Parkersburg, W. Va., Seeks Coöperation of Public Utilities in Reducing Pavement Openings

By William Kennedy

Executive Secretary, Board of Commerce, Parkersburg, W. Va.

THE city of Parkersburg, W. Va., has been going ahead vigorously with street paving improvements. Market Street, the main thoroughfare of the city, runs north and south. The Baltimore and

rail and is paved with 4-inch vitrified brick on a 9-inch concrete base with a 1-inch sand-cement cushion intervening. On either side of the street railway area, the street is finished with sheet asphalt on a concrete



MARKET STREET, PARKERSBURG, W. VA., DURING REPAIRING, LOOKING NORTH, WITH THE MUNICIPAL BUILDING IN THE LEFT FOREGROUND

Ohio Railway main line from St. Louis to New York is carried over the street by an overhead bridge.

Hitherto Market Street has carried a single track for street railway transportation with a half-block of double track for switching purposes opposite the City Hall. The new improvement, just finished, gives the street a double track from Third to Seventh Street. The car track area embraces, besides the space between the rails, a strip of 2 feet on the outside of either

base. There are five blocks or squares in the improvement on Market Street with a width of 38 feet between curbs.

The grading, curbing, concrete base, brick surface and construction of storm water sewers and inlets were done by the Kennedy Construction Company of Parkersburg, while the sheet asphalt was laid by the Federal Asphalt Paving Company, of Hamilton, Ohio. The entire improvement was completed in six weeks. About one month before paving operations started, all public

utilities and plumbers began to renew their water, gas and sewer lines. To facilitate this work, one block was closed at a time and all interested parties were notified to make their renewals and installations of lines at one operation. After the first block was completed, another was opened, and so on until the entire portion of the street to be improved was gone over carefully.

Koehring concrete mixers of the latest type were used. The brick was furnished by the Hocking Valley Brick Company, of Logan, Ohio. Atlas cement, Trinidad asphalt, Carey expansion joints, Ohio River sand and gravel, and asphalt sand from Sandusky, Ohio, were the materials used in the construction of the pavement. Steel rail was furnished by the Lorain Steel Company, and switches and other special track work by the Bethlehem Steel Company. Twin steel railway ties were used. The cost

of the improvement, borne by the street railway company, the property owners and the city, is slightly over \$45,000.

Single-track construction, identical with the foregoing, has recently been completed on Juliana Street and Seventh Street for a total distance of ten blocks. In connection with the improvement of these two streets the sides are to be resurfaced with 2½ inches of sheet asphalt, using the present old brick paving as a foundation. This plan has been given a thorough test on other streets carrying heavy traffic—Fourth, Fifth, Avery Streets and others—and has given general satisfaction. The estimated cost of the paving on Juliana and Seventh Streets is about \$56,000.

Plans and specifications for this work were drawn up by City Engineer Leland G. Merrill and carried out under his supervision.

200,000 Workers to Be Employed in State Highway Construction Under Federal Highway Act

CONSTRUCTION of highways to the total value of \$76,400,000, covering 6,261 miles and employing more than 150,000 workers, is about to be undertaken by 30 states, as the direct result of the recent passage of the Federal Highway Act. This is the act which was recommended by the President's Conference on Unemployment as an emergency measure to provide jobs for the nation's unemployed.

The figures as to the amount of work which could be undertaken by the states in the construction of highways were supplied by the governors in response to letters sent them by Secretary Hoover. The letters asked what amount of work they could get under way within a period of 90 days after the passage of the act.

According to the act, which created a fund of \$75,000,000 to be apportioned among states taking advantage of the 90 days' period, each state will be entitled to receive, on the basis of the value of its work, its specified Federal allotment. Part of this allotment is available now and part will be available January 1. These amounts are of course in addition to the allotments received by states under the provisions of former Federal Aid acts. Estimates show

that \$40,000 will be the average amount per mile expended by the states. When the work is completed and approved by the Federal inspector, the state will receive back from the Government about \$20,000 per mile.

How this state undertaking will affect the general condition of unemployment can be estimated from the replies received here from governors. Texas can employ 13,500 workers on a \$8,000,000 road-building job, covering 700 miles within the 90 days required. Georgia can provide 9,000 men with jobs on a \$5,000,000 undertaking, covering 360 miles of roads. Indiana can use 5,800 men; Michigan, 5,600; Ohio, 5,300; North Carolina, 5,000; Minnesota, 4,350; Louisiana, North Dakota, South Dakota and Mississippi, 4,000 each.

Directly and indirectly, probably 200,000 workers will be employed in state highway construction. This means that in addition to those directly engaged in road building, there will be a large number indirectly set to work providing material for the builders. These will be employed in quarries, cement mills, sand-banks, asphalt plants, gravel-pits, and shops manufacturing road-building materials and tools.

The Adequate and Attractive Lighting of City Streets

Part I

By L. A. S. Wood

ADEQUATE illumination of streets at night, besides being a convenience, is a protective necessity to every community. Good lighting is an indication of prosperity, and an investment in a well-designed ornamental street lighting system returns large dividends to the taxpayers in advanced real estate values.

It creates an impression of thrift and progress, advances civic pride, attracts favorable publicity and promotes other improvements. It assists the fire and police departments, facilitates congested traffic and decreases crime.

In the early days of electricity, street lighting design was a simple problem, the solution of which generally took the form of a suspended arc lamp at street intersections. With the growth of the "City Beautiful" idea, however, and the demand for lighting systems of a more ornamental character which will eliminate unsightly overhead equipment, many factors not provided for in the earlier systems have to be considered. The more important of these are the size of the city, the character of the buildings, the presence of foliage on the streets, and the local conditions controlling the distribution of electricity.

Standard of Illumination

The standard of illumination on streets was set by the earlier types of "open" carbon arc lamps, which were later replaced by an improved type having longer burning hours, known as the "enclosed" carbon arc lamp. The latter was not as efficient as the open arc, and its substitution in place of the earlier type tended to decrease the standard of illumination, which was generally lower than was customary in the larger cities of Europe. The energy consumed in lighting a comparatively small room in a public building is often greater than that consumed in lighting one mile of the average city street with ordinary pendent units.

Street lighting rates, with few exceptions, have remained practically constant for many



A LIGHT STANDARD LOCATED ON THE SIDEWALK AND HARMONIZING WITH THE SURROUNDINGS, AT MIAMI, FLA.

years, in spite of the fact that there has been a large advance in the cost of material and labor. The per capita cost of street lighting is generally low, and there are few cities spending over \$3 per capita. The average for the fifty best lighted cities is about \$2, and for the whole of the United States not more than 71 cents per capita.

Requirements of an Ornamental Street Lighting System

Since the introduction of the high-efficiency Mazda "C" incandescent lamp, which has revolutionized street lighting, eliminating the ornamental cluster post of earlier days and decreasing the use of the arc lamp, development in ornamental street lighting has favored the single-light post equipped with suitable lighting unit or "post top" to distribute and direct the light on the plane of illumination.

The first requirement of an ornamental

street lighting system is that, while efficiently illuminating the streets during the hours of darkness, it should be inconspicuous in the daytime, blending harmoniously with the architecture of the surrounding buildings.

Another important requirement of good street lighting is that the intensity of illumination should be graduated in accordance with the conditions of the various localities, and the flexibility of the Mazda system renders it particularly suitable for this class of work. Until the public became aroused to the necessity of well-designed and uniform systems of ornamental street lighting, progressive merchants installed, at their own expense, systems of ornamental posts or "White Ways," which often resulted in the installation of posts of various designs in different parts of the same city.

This activity on the part of merchants should be carefully directed by municipal authorities, and the uncontrolled installation of "White Ways" should be discouraged. An ornamental street lighting system should be considered as part of a plan to beautify the city as a whole and not as means of advertising one section, perhaps to the detriment of some other locality.

Promotion and Financing

There are various methods of promoting the installation of ornamental lighting systems, but the most successful have been through chambers of commerce or commercial clubs. Municipalities are, as a rule, reluctant to consider such lighting until there is a publicly expressed demand.

In a number of states there are existing laws which permit the establishment of assessment districts for the purpose of taxing abutting property for the installation of special lighting. In such cases usually 51 per cent of the frontage involved must be signed up to make the petition effective. Street lighting improvement acts have generally assisted the process of ornamental street lighting and, where available, should be used. The assessment becomes a taxation, and the contract is between the city and the central station, thus insuring a uniform installation with continuity of service, under the control of the municipality.

The assessment of property owners for the up-keep of lighting installations is not new, and the following extract from "Municipal Government," by Frank J. Goodnow,

LL.D., published in New York by the Century Company in 1910, page 328, describing Paris in 1666, is of interest:

"The expense of lighting the streets was defrayed also from the receipts of a tax imposed on the householders. Mildmay says: 'Two persons are generally contracted with for this undertaking; the one to find the lanthorns, cords and pullies, and the other to supply the candles; for the streets are here illuminated by hanging lanthorns on the middle of a cord that reaches across the street; and is fixed to pullies on each side, at about fifteen feet high and about fifteen yards distance from one another. There are sixty-five lanthorns and consequently as many candles consumed each time they are lighted, which is only twenty times a month, being laid aside during the moon-light nights; and are never lighted but from the last day of September until the first day of April each year; being taken down and set apart during all the summer months.' Elections were held annually in each quarter of the city by the householders. The persons elected had each charge of fifteen lanterns and paid, as Mildmay puts it, 'some menial servant or poor housekeeper in the same street to perform the duty; accordingly every evening, as soon as it begins to grow dark, the commissary sends out a person, ringing a hand bell, through the streets of the quarter to give notice, as in the morning for cleaning the streets; so now for lighting them; upon which each lanternier's servant immediately sallies out and having a key to the iron box in which the end of every cord is fastened on the sides of the streets, lets down the lanthorn hanging on the same and fixing his lighted candle therein draws it up again; and thus everyone having only fifteen lanthorns under his care, the whole city is illuminated in a very short space after notice; though the light itself is indeed a very indifferent one.'"

System of Operation

Owing to its flexibility, the Mazda "C" lamp is peculiarly adapted to ornamental street lighting, and, when operated on a constant-current series system, it affords an efficient and economic street lighting unit, easily installed and controlled, giving a range of from 600 lumens (60 candle-power) to 25,000 lumens (2,500 candle-power). Any size lamp within this range may be operated in series on the same circuit without changes in the regulating equipment at the central station, and, with suitable enclosing glassware, a soft diffused illumination or a brilliant sparkling light without glare may be obtained.

The regulating equipment generally consists of moving coil type, constant-current regulating transformers and control panels which limit the current in the circuits, safeguarding the lamps against surges and, at

the same time, insuring that sufficient current will flow through the lamps at all times to maintain the rated candle-power.

In addition to regulating equipment of the station type moving coil, regulating transformers have been designed suitable for mounting on poles at any point in a high-tension distribution network, thus permitting an ornamental lighting system to be connected to a high-tension line without the necessity of running special lighting circuits back to the substation. This improvement in regulating apparatus, which may be operated either from a time switch or from a remote control device, materially re-

for the engineer's serious consideration, owing to the fact that the equipment—unlike the old cluster posts—is operated on a high-tension system, requiring fixtures specially designed for this purpose.

The Underground System

Until the introduction of steel-armored and lead-covered cable, it was customary to lay underground cable in conduits, but modern practice favors the use of steel-armored cable buried in a shallow trench below the curb or in the parkway. If properly installed, the life of this cable is almost indefinite, as the lead cover forms an efficient



A NIGHT SCENE IN NEW CASTLE, PA., SHOWING THE EFFECT OF IMPROVED WHITE WAY LIGHTING WITH LITTLE LOST UPWARD ILLUMINATION

duces the cost of installing ornamental lighting systems at a distance from the substation. Another method of control for series Mazda lighting is the adjuster or reactance socket system. This is generally used for small groups of lighting units and is operated from a constant potential transformer with a reactance coil connected in parallel with each socket. When a lamp burns out, the current is forced through the reactance coil, introducing an impedance in the line equivalent to the energy absorbed by the lamp, thus maintaining the circuit current constant.

The earlier types of cluster posts were usually operated on multiple systems, but, while there are still some ornamental lighting systems installed in multiple, the series system is the one generally adopted. This condition has made the selection of ornamental street lighting equipment a matter

protection from water, while the steel armor protects the cable from mechanical injury. The posts are usually wired with rubber-covered and braided cable. It is important that ends of cable, where cut, should not be exposed to the weather. We are all familiar with the precautions taken by cable manufacturers to seal the ends of the cable before it leaves the factory, but, unfortunately, very little care is exercised in this direction when the cable is installed. It is quite common, during the installation of ornamental lighting systems, to see the ends of the underground cable projecting through the ground, exposed to all weathers, until the posts are installed and connected, with the result that faults are likely to develop at an early date and the installation becomes a source of trouble and expense.

The best way to install armored cable is to lay it in a prepared trench, leaving a loop

at the location of each post sufficiently long to reach the terminal of the disconnecting device in the base of the post, and to pour cement around the loop to form the foundation for the post. This is a more satisfactory method than the one usually followed of making the post foundations first with the conduit elbows for the cable to be drawn through, as it leaves the cable intact until the time the connections are made in the base of the post.

A disconnecting pothead should be used in the base of the post, and this should be of such design as to thoroughly seal the ends of the steel-armored cable and efficiently bond and ground the steel armor and lead covers. It should also be designed so that the post wiring is automatically disconnected from the underground system and the circuit in base of post reestablished by a short-circuiting device in the event of the post's being accidentally broken. It is desirable that a device be used in the top of the post for relieving the terminals of the lamp socket from the strain of the weight of the cable used in wiring the post.

In the constant-current series system of operation, the high-tension current is car-

ried up the post, and, although when properly installed this is not objectionable, several cities have preferred to use a safety coil in the base of the post so that a voltage equivalent to the voltage of the lamp only is carried up the post. Safety coils have been designed equipped with disconnecting pot-heads which have all the advantages of the latter device, coupled with the safety feature of low voltage in the post.

"Part Night" Circuits

Occasionally, in the interests of economy, it is found desirable to decrease the illumination on the streets after midnight, when only protective lighting is required, and this is best accomplished by dividing the lighting system into two circuits, one operating the "all night" lamps and one operating the "part night" lamps. For this purpose, two single conductor cables may be laid in the same trench, connecting with alternate lamps or any other combination desired. If preferred, a twin conductor cable may be used.

ACKNOWLEDGMENT.—From a paper presented before the American Society for Municipal Improvements at a convention held in Baltimore, Md., October, 1921.

Concrete-Road Reinforcement; Novel Foundations Used

How a reinforced concrete road holds up under heavy traffic is to be determined by the Bureau of Public Roads, United States Department of Agriculture, through experiments to be conducted on such a road now being built in the suburbs of Washington in coöperation with Arlington County, Va.

The road is being reinforced with many different arrangements of wire mesh and round steel rods embedded in the concrete. The joints will be either a crack left in the road, to be filled with tar, or simply a sheet of corrugated metal set on edge with the concrete poured around it. Some sections are to have joints running along the middle of the road, some across it, and some will be built without joints.

Of especial interest is the construction of

ribbed sections. Instead of placing the concrete on a nearly flat subgrade, trenches will be dug in the subgrade running parallel to the edges of the road and also across the road. These trenches will be filled with concrete, giving the slab downward projections of concrete, and presumably strengthening it. Experiments also will be conducted to determine the strengthening effect of treating the earth under the concrete. On one section the earth for a depth of 6 inches will be mixed with cement, using 1 part of cement to 20 parts of earth. In some places where there is a grade, a trench under the concrete will be filled with gravel. These trenches will slope toward the edges of the road and drain away any water that might otherwise accumulate under the surface.

Two Coming Conventions

JANUARY 17-20.—CHICAGO, ILL.

American Road Builders' Association. Annual convention. Secretary, E. L. Powers, Editor, *Good Roads*, 11 Waverly Place, New York, N. Y.

JANUARY 18-20.—NEW YORK, N. Y.

American Society of Civil Engineers. Annual meeting. Secretary, Charles Warren Hunt, 33 West 39th Street, New York, N. Y.

The Eternal Triangle of Plague— Rat, Flea, Man

By W. Dwight Pierce, Ph. D.
Consulting Entomologist, San Mateo, Calif.

IN the less enlightened ages of world history there were many periods of consternation and intense suffering when the dreaded plague swept through the cities of Europe, Asia and Africa and literally wiped out whole communities. Those in authority in those days were really pardonable, as they did not know whence the plague came, nor how it spread, and consequently had no idea as to what measures they should take to save their people.

But it is different to-day. Those in authority do know, or should know, whence cometh plague, how it is spread, and also what measures they must take to protect our citizenry. And yet plague still exists on our earth and still frequently knocks at our very doors, and so we must make certain that the necessary information has actually reached the people who must know.

Where the Responsibility Rests

There is a marked tendency in American cities to take it for granted that our Public Health Service is adequate to protect us from diseases of all kinds that might come to our shores, and therefore to shift all responsibility to its shoulders, though by so doing we are apt to make the fulfilment of its task impossible. The truth of the matter is that the people of American cities are responsible for the greater part of the task and that they alone can make it possible for the small group of health officers to protect us from this dread disease.

In evidence of this we have but to cite the recent example of how typhus fever crept into our eastern cities with the immigrants in spite of the vigilance of the inspectors, and now endangers the lives of the poorer immigrant classes in the congested parts of our great cities.

To use a well-known phrase, we may discuss the problem of plague as that of an Eternal Triangle, since it always involves the relationships between man, the flea and the rat, the wicked flea having an affinity

for, and undue familiarity with, both man and rat.

We cannot keep plague out of the country by merely keeping plague patients out, if we let the rats in. If one rat bearing one infected flea should board a ship at an infected port, every person on that ship is in danger, and if a single flea-bitten person, or a single flea or rat, leaves that ship at one of our ports, the citizens of that port are all endangered. So how can we expect the little corps of inspectors at each port to do all the work of protecting our cities? Is it not evident that every one of us has a distinct part in the task?

The Causative Organism of Plague

The organism of plague is of course the offending party. It is known as *Bacillus pestis*, and is a minute, one-celled, bacterial organism which must alternate its hosts occasionally in order to keep up its virility. It requires a change of food and climate from time to time, and must also have a means of reaching new food when it has consumed its old. And so in the processes of nature we have seen evolved a wonderful interrelationship between this organism and the Eternal Triangle of which I have spoken.

We do not know how this organism arose, nor which is its original host, but we do know that ordinarily it lives from generation to generation in habitations of filth, passing from rat to flea, and flea to rat. Under this term "rat" we must include a number of species of rodents, as well as all the common rats, for the organism has been found in several species. And in like manner there are several species of fleas capable of spreading it from host to host.

The Organism in the Rat

In the rodent host it lives and multiplies in the blood, causing swellings, or buboes, on the lymph glands and other internal organs. Hence its name—bubonic plague. It quite naturally results that as the numbers of organisms grow and consume the blood

cells of the host animal, the vitality of the host decreases, and the bacilli obtain less and less nourishment. If there were no means for them to escape, they would perish with the host.

The Organism in the Flea

But here is where the flea comes in. Almost every rat and other rodent is a living hotel for a multitude of fleas, which suck its blood as long as it is healthy. Naturally, these fleas take up from the blood not only the blood corpuscles, but also the tiny parasitic bacilli of the plague, and the sicker the animal, the more bacilli do the fleas take up. Thus the bacilli escape from the perishing host.

It has long been noted that, just as a rat will leave a sinking vessel, so does the flea leave a dying host. As the rat becomes sicker and its fever mounts, the temperature becomes unpleasant for the fleas, which perhaps also notice unpleasant qualities in their food—the blood—and the fleas hop off onto another rat. It begins to look as though the bacilli are to be provided with a continuation of their progeny.

But the bacilli have been accustomed to living in the warm blood channels of the rat, and now they have found themselves taken up into the esophagus of a tiny cold-blooded flea, and in the due processes of digestion they may enter the stomach of the flea, where they struggle for existence with the digestive processes aimed at assimilating them into nutriment for the flea. However it may be—and we assume that many perish—it seems that this period of existence in the body of the flea gives new strength and vigor to the surviving bacilli, perhaps just as a change of climate will invigorate us.

Transmission from Flea to Rat

Now the question arises as to how the bacilli ever escape from the flea and get into a new host, and we may point out four possible or probable ways. The science of disease transmission has not yet been advanced sufficiently far to enable us to know absolutely all the details of this interesting transfer.

It is very common for rats and many other animals to free themselves from the irritation caused by the fleas by licking up and eating the little pests. This would bring the bacteria back into a rat and they

could possibly find their way from the alimentary canal into the blood.

But clever investigators have found that often the esophagus of the flea becomes choked up with the plague bacilli and that they are also in the salivary glands, and hence when the flea sucks blood, some of the little bacilli are washed into the wound and obtain straight entrance to the blood. Very likely this is the predominant method of transfer, but we must not overlook the possibilities of other methods of transfer.

As we study the relationships of insects to the transmission of disease organisms, we find that almost all bacteria which are taken up and transmitted by insects go normally through the digestive tract of the insect and are voided in its excrement. Now in the case of lice, we have found that infection takes place by the scratching into the blood of the infected feces on the skin of the animal, or else by the insect's inoculating the animal by forcing the bacteria into the body when it makes its feeding puncture. There is strong reason to believe that this same thing may occur with plague.

It has also been found that when insects lay their eggs these are often surrounded by a glutinous mass in which are many bacteria and that when the larvae hatch, they eat these bacteria. At any rate, we know that fleas breed in filth, and that their larvae are capable of ingesting and maintaining the existence of a number of disease organisms, and we may infer that possibly they may so propagate the plague organism.

Where Man Comes In

Thus we have seen the ordinary cycle from rat to flea and back to rat, and if this were all, we need have no fear, but unfortunately rat fleas commonly attack man, and thus by the same methods man, instead of the rat, becomes the host of the disease.

The good householder may lift up his head and say, "I am in no danger of plague, because I keep my house clean, and am never bothered with fleas." Nevertheless, entomologists are besieged with complaints of houses of careful people that are overrun with fleas. Sometimes this is due to household pets, but often it is because rats and mice have found their way in.

Then, perhaps, the householder says, "Well, suppose we do have rats and mice and fleas; there is no plague in the United States, so why should we fear?" If I had

the time, I might point out how the flea carries other dangerous diseases, and is always a menace in any household, but we must keep our attention fixed on the plague problem.

This world is not as big as it used to be. That is, we are in much closer contact with our brethren of other countries than we have ever been before, and if plague exists anywhere on earth it is almost at our back door. As long as the masses of population in India and China live in poverty and ignorance, so long will plague exist on earth. As long as rats are allowed to multiply and depredate the granaries of the world, so long will plague exist on earth. No matter how cleanly our cities, nor how many health officers we have, if we feed the millions of rats in our midst we maintain an open invitation for the spread of plague.

The Menace of the Rat

There is real cause for alarm among sanitarians at the tremendous drain upon our food supply by rats and mice. Conservative estimates place the number of rodents in the United States at one for each person in our population, and their depredations at one-half cent per rat per day. This loss is figured at \$180,000,000 per annum. In some of our cities, as, for example, Dallas, they rove in droves and clean out a barn in a night. The Public Health Service in its anti-plague work at New Orleans, Seattle and other cities kills millions of rodents a year and examines them for plague. The alarming thing about it is that they do find plague-infected rats in many of our coast cities, and that every few years we have outbreaks of human plague, as, for example, its recent occurrences at Pensacola, Mobile, Galveston, New Orleans, San Francisco, Seattle, etc.

The Time for Action

Will our American cities wait until the pest is at our doors or in our midst to begin the fight against the rat? Will we

wait, as New Orleans did until cases appeared in many parts of the city and Government officials forced the city to take active measures to protect the lives of its citizens? Have we grown so callous that we must be face to face with hideous disaster before we start to cleanse our cities? It certainly looks as if we have settled into an apathy wherein we regard the rat as a necessary nuisance.

New Orleans, when confronted with disaster, went at the problem with a will and forced every single house and store to be rat-proofed, and conducted a most vigorous campaign against the pest. But it is necessary that there be no relaxation of vigilance.

Every city and town in America should join in an active anti-rat campaign, which will exclude the rats from all buildings and kill those in our midst, and then they must persist in the fight against those which will continually come in from the rural districts.

Flea Control

The flea breeds in dirt, and when adult, feeds on blood. Dirt cellars and dirt floors in barns, even the dirt accumulated in and under carpets, furnishes excellent breeding grounds for the flea larvae. Cleanliness is the first requisite, but much can be done by dusting with insect powder—pyrethrum, or buhach, or with sodium fluoride. The house must be made rat- and mouse-proof, and all domestic animals should be kept out of the house.

Keep Posted

Those who are interested—and this should include every public official—should secure bulletins on the flea from the Bureau of Entomology, and on the rat from the Public Health Service.

You who read this article have a responsibility to fulfill. Seek out your duty and make it a point to see that your duty tackles the rat-flea problem in an intelligent and active manner.

A Community Is Known by the Roads It Keeps

The roads in the vicinity always advertise a town or a community, good or bad. As the roads are, so the tourists judge the town. In some towns after every rain, the merchants can play checkers in the back rooms because the country folks can't get in. A great deal of the impression tourists get of a place is formed by the roads they travel over.—*Every Good Roads News.*

The Better-Cities Contest in Oklahoma

By William A. McKeever

SOME thirty-six of the middle-sized municipalities in Oklahoma are engaged in a contest to determine which of them at the end of a year's trial shall prove to be the most nearly ideal place for the rearing of children.

After hearing at a lunch meeting an explanation of the proposed project, the Rotary Club of Shawnee pledged an award of \$2,500 to be given to the city which averages the highest on a ten-point score sheet at the end of the campaign. The Lions' Club has since joined the Rotarians in the pledge and Shawnee will also compete for her own prize, as well as act as the challenger and temporary "model city." Her population is about 15,000.

The fundamental idea of this friendly contest is to arouse the people to act unitedly for an all-round improvement of the training conditions of the growing generation. Not only the competing cities but practically the entire state can thus be made aware of the program of betterment and can be expected to partake both directly and indirectly of many of its projects.

The better-cities campaign seeks to contribute something toward bringing the entire program of education back under the dominance of the parents, the teachers and the commercially disinterested friends of the young. Aside from the prize of \$2,500 and eight prizes of \$100 each to cover eight of the individual points on the score sheet, this movement is entirely free from the usual drive for money. We are mobilizing not money, but the minds and hearts of all the people. No one has anything to sell or exploit here, and no fees or salary is paid to the author, who organized and is conducting the campaign.

Perhaps it is this freedom from personal gain and preferment that gives this better-cities movement its peculiar virtue. It is everybody working for all the children. At about Thanksgiving time we expect to bring into the state a committee of judges of national standing and these will personally visit and grade on the points listed

each city in the contest claiming to have conspicuous rank.

In practically all the contesting cities mass meetings have been held, from three to six audiences having been addressed and a central committee organized to lead locally in the work. The response has been most hearty, and the effort is being directed through sub-committees representing the home, the school, the church, and the community, as the chief educational institutions.

Rotarians, Lions, Kiwanians, Chambers of Commerce, Churches, Sunday Schools, Women's Clubs and others of the class have everywhere given us enthusiastic support, and scores of new projects for better juvenile life have consequently been undertaken. Shawnee, the challenging city, has recently put on a great public demonstration—a spectacular festival event—as propaganda for its own interest.

At the date of writing this, thirty-six cities have entered the contest and all have made a commendable showing, while some have emphatically revolutionized their programs of moral welfare.*

The ten points on the score sheet are:

1. Facilities for play and recreation
2. Industrial training as suited to character development
3. The general condition of the public schools
4. The health conservation of the young
5. The management of children through the interest in scouting
6. The safeguarding of the community morals
7. The management of the social affairs of adolescents
8. The religious training of the young of all grades
9. Clubs of men and women rendering services to the young
10. The housing situation in relation to family well-being

EDITORIAL NOTE.—Dr. McKeever, the author of this article, is Extension Professor of Kansas University and Director of Juvenile Welfare of the Presbyterian Church of the United States of America. He has personally assisted all but two of the places that have entered the Better-Cities Contest in Oklahoma.

*Shawnee has since been announced the winner.

The Trailer in Garbage and Ash Collection

Experience of Indianapolis, Ind., and Winnipeg, Man., Typical of Modern Garbage Collection Methods

FOR two or three years the city of Indianapolis, Ind., experimented with trailers in ash collection. Then, in 1918, four tractors and 24 trailers were purchased, producing a saving of \$30,000 the first year on the original installation cost of \$58,000. The city has just purchased eighteen 2½-ton Highway drop-frame trailers equipped with 3½-yard two-way steel gravity-dump bodies for the collection of garbage.

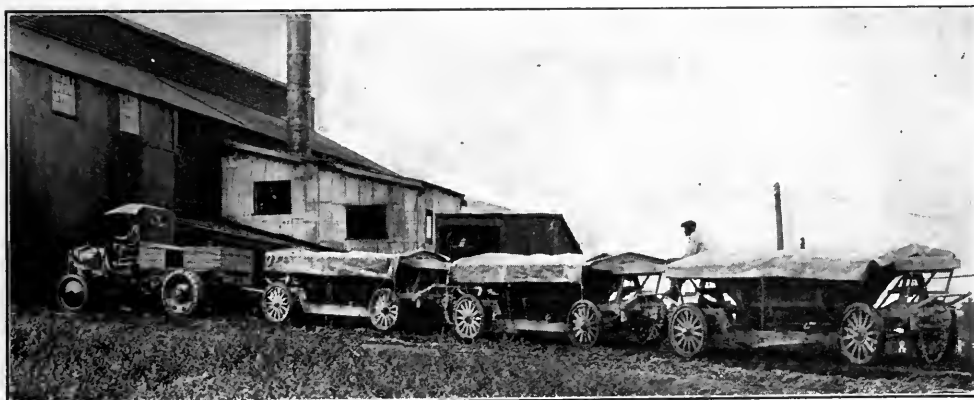
The teams leave the trailer yards at 6 o'clock in the morning for their respective districts. An hour and a half later three 5-ton tractor trucks, pulling a train of three trailers each, leave for the various districts, where the empty trailers are left at predetermined locations, and the loaded trailers are then picked up and hauled to the incinerator, which is 8 miles distant from the farthest district. These trucks make three round trips daily. Each trailer carries 3½ yards of wet garbage, or from 10 to 12 yards per train. The trailers are equipped with end locks, and the bodies dump automatically. The bodies before leaving the dumping pit are washed out thoroughly by means of a hose. As the train leaves the dumping pit, the road-bed is inclined a little to the left, which causes the body to return automatically to its upright position.

Experience of Winnipeg

In Winnipeg, Manitoba, in 1919, it was found that the cost of long hauls within the city for the various classes of refuse and ashes was just twice as much as the cost of actual collections. Remedy was found in the purchase of four 3½-ton motor trucks and seventeen trailers, each with a carrying capacity of 5 cubic yards. The following equipment was purchased:

Trucks—	
Two 3½-ton Sterling trucks at \$6,406.76.	\$12,813.52
Two 3½-ton Service trucks at \$6,730.00..	13,460.00
Trailers—	
Nine Troy trailers at \$2,030.00.....	18,270.00
Tax	183.70
Five team poles at \$20.00.....	100.00
Eight Model N-4 Highway trailers at \$1,816.68	14,533.44
Five team poles at \$35.00.....	175.00
Twenty-one bodies, capacity 5 yards, all steel, end-dump, including tax.....	9,639.00
	<hr/> \$69,174.66

On July 2, 1920, at 7 A. M., the two Service trucks were put into commission and worked steadily on the collection of garbage throughout the whole month at a cost of \$3.30 per ton. All figures are given as a cost per ton only and not per ton-mile, as the standard of refuse collection in Manitoba has always been taken as the cost per ton of refuse collected and delivered at its destination, whether at the crematory or the dump. No trailers were used during the



ONE OF SIX TRAILER TRAINS USED BY INDIANAPOLIS, IND., FOR THE COLLECTION OF GARBAGE AND ASHES

month of July, as the bodies were not completed, but in August the two Service trucks were worked in conjunction with the trailers, and the first Sterling truck was put into commission also. During the month 405 loads of garbage were collected, 108 by truck and 297 by trailers.

Manner of Operating Trailers

The trailers were operated for the collection of garbage exclusively by teams in the following manner: Six teams with drivers and helpers left the city barns, and each team was hitched to a trailer. Each team with its driver and helper then proceeded to its appointed district for the collection of garbage. Two teams went to Fort Rouge, two went to the center of the city, and two went north. At an appointed time and place the two outfits at Fort Rouge were met by a truck hauling two empty trailers, and an exchange was made, the truck leaving the two empty trailers and taking away the two loaded ones to the incinerator. Thus one truck with a chauffeur and helper collected two loads of garbage per day on its own account and also made two trips to Fort Rouge with two empty trailers to be exchanged for two loaded ones. Each team took its last loaded trailer to the city barn ready to be removed by the truck the first trip next morning.

The Fort Rouge team made three loads per day; thus a cycle was made with one unit, consisting of one truck with chauffeur and helper, two teams with drivers and helpers, and four trailers. Two trailers were on the road while two were being loaded. The cycle of one unit for the North End of the city was exactly a duplicate of the one at Fort Rouge, as each team made three loads per day, and the truck in charge made eight loads, six by trailers and two by the truck alone.

The cycle for the one unit in the center of the city was slightly different, as each team made four loads per day and the truck made two loads also by itself. Thus with three units of two teams each, working independently of each other, the cost of collection per ton was reduced from \$3.30 to \$2.60, or a saving of 70 cents per ton for the month of August, 1920. In September the other Sterling truck was put into commission, and the units as working for the month of August were slightly changed. Two additional teams were put on to the

operation of trailers, making eight teams in all, one being added to the North End unit and one to the center. The cost of collection per ton for the month of September was again lowered to 24 cents per ton, making the average cost of collection \$2.36.

During the month of October a further change took place. It was decided to make up a train of one truck and three trailers, instead of two trailers as previously. Thus the North End unit was made up of three teams with the units in the center of the city, putting both units in charge of one truck, making a complete cycle of nine trailers and six teams, three trailers being on the road while six trailers were being loaded. The truck was not loaded at all. The feasibility of working two collection units with one truck as tractor was figured along the following lines:

First, the distances from crematory No. 3 to the North End of the city made on a definite route figured 8 miles round trip, while from the crematory to the center of the city made a round trip of 6 miles. The first trip of 8 miles would take about one hour, while the second at the same rate of speed would require three-quarters of an hour. The time taken for coupling the train and dumping at the crematory was estimated at 30 minutes.

A schedule was made up along the lines of a train schedule, as follows:

Teams in operation: North End, 3 teams; center of city, 3 teams

The North End unit to collect 3 loads per day, per team

Center unit to collect 4 loads per day, per team

Truck to start in every case from the crematory to the loading point. Truck takes 3 carried-over loads to crematory every morning, and team in every case takes last load to barn at night

Time schedule for operation of 3 trailers run as a train—

Truck with 3 carried-over trailers leaves crematory (A. M.)	8.00
Trip to center of city and return, 45 minutes...	.45
Coupling up train and dumping load, 30 minutes.	.30

Time of train leaving crematory.....	9.15
Trip to North End and return, 1 hour.....	1.00
Coupling up train and dumping load, 30 minutes.	.30

Time of train leaving crematory.....	10.45
Trip to center of city and return, 45 minutes...	.45
Coupling up train and dumping load, 30 minutes.	.30

Time of train leaving crematory.....	12.00
Dinner, 1 hour.....	1.00
Trip to North End and return, 1 hour.....	1.00
Coupling up train and dumping load, 30 minutes.	.30

Time of train leaving crematory.....	2.30
Trip to center of city and return, 45 minutes...	.45
Time of coupling and dumping load, 30 minutes.	.30

Time of train leaving crematory.....	3.45
Times to pick up: North End, 9:45 and 1:30; center, 8:25, 11:10 and 2:55	

Last load taken by each team to city barn

By taking all left-over loads to crematory, the truck removes 9 loads from North End and 12 loads from center daily



THE TRAILER YARD AT INDIANAPOLIS, SHOWING HORSE-DRAWN TRAILERS STARTING OUT FOR THE DAY'S WORK

This schedule was given to the team foremen, and a tryout was made; good results were obtained. The record of the truck with nine trailers for the month of November was as follows: 423 loads were hauled, amounting to 1,217 tons hauled to the incinerator. The truck traveled 908 miles, and the total cost of operation was \$2,769.26, or \$2.27 per ton. This figure again cut the cost per ton by 9 cents. During snowstorms it was found that a train of three trailers proved too much for one truck. The detailed cost of operating a truck and trailer for the week of November 1-6, 1920, was as follows:

Cost of Operating Truck—	
Chauffeur	\$32.30
Helper	28.50
Oil, 65 gallons at 50 cents.....	32.50
Tires, 237 miles at 3 cents.....	7.11
Overhead charges, \$4.28 x 7	29.96
<hr/>	
Cost of operating truck.....	\$130.67
Tons collected, 296	
Cost per ton, hauling, \$44	
Cost of Operating Trailers—	
Six team drivers at \$30.....	\$180.00
Six helpers at \$28.80.....	172.80
Up-keep of 6 teams, \$3 x 6	108.00
Nine trailers—depreciation, etc.	40.50
<hr/>	
\$501.30	
Tons collected, 296	
Cost per ton, collected, \$1.69	
Total cost of collection and haulage.....	\$631.97
Tons collected, 296	
Total cost per ton, \$2.13	

To make the collection of garbage a paying proposition by trucks and trailers, it is vitally necessary to know exactly what a truck can do, what it costs to operate, and how many miles per day can be expected. Winnipeg lacks one trailer of being able to operate two cycles of nine trailers. It was found that the cost per day depends on the daily mileage of haul, plus the cost of collection. Therefore, the cost per unit must equal the length of haul plus the trailer capacity. Because of this, the cost per ton should decrease with the increase of trailer capacity, and an argument based on this theory must eventually decide that it does not pay to load a truck with garbage in house-to-house collection, on account of the many starts and stops which are necessary. It does pay to haul by the train load. The horse cannot compete with the truck as a means of haulage when the haul is long, but many places besides Winnipeg feel that he can still hold his own on the short haul. Ton-mileage is what counts, and this can only be procured by keeping the truck moving and loaded to capacity by trains.

The main point at issue is the development of a steady combination of power traction coupled with a systematic horse-drawn collection. Regular collection is the only means of continuing efficient service.

Thus, if tin cans are collected by the regular teams on a given day each week and a holiday occurs on that day, omit the tin collection entirely for that week, so that the garbage collection and service will not

suffer, causing undue accumulations. Ash service can be carried out along the same lines if necessary, as is generally the case in Indianapolis, where its success has been complete.

Cleveland Adopts City Manager Plan and Proportional Representation

ON November 8, Cleveland adopted at the polls, by a vote of 77,704 to 58,349, amendments to its city charter providing for the city manager plan of government and the election of its council by the Hare system of proportional representation.

Cleveland is much larger than Akron, the next largest city which operates under the city manager plan, and is about ten times as large as Sacramento, the next largest city which elects its council by proportional representation.

Professor A. R. Hatton of Western Reserve University, who drafted the amendments, is quoted as follows in the *Cleveland Plain Dealer*, following the election:

"A new type of council will be elected. It will be much closer to the real interests of the people than any council Cleveland has previously seen. . . . There is no doubt that the coming of the manager plan means greater executive efficiency, and therefore more service to the people. Getting politics out of the executive side of the city government alone would do that. It will also mean the setting up of an executive service which the people can reach and control at all times."

The new form of government does not go into operation for two years, the first election under the amendments being held in November, 1923. This allows time to gain practical familiarity with the plan.

Four Schemes for Making the Most of Ten Acres

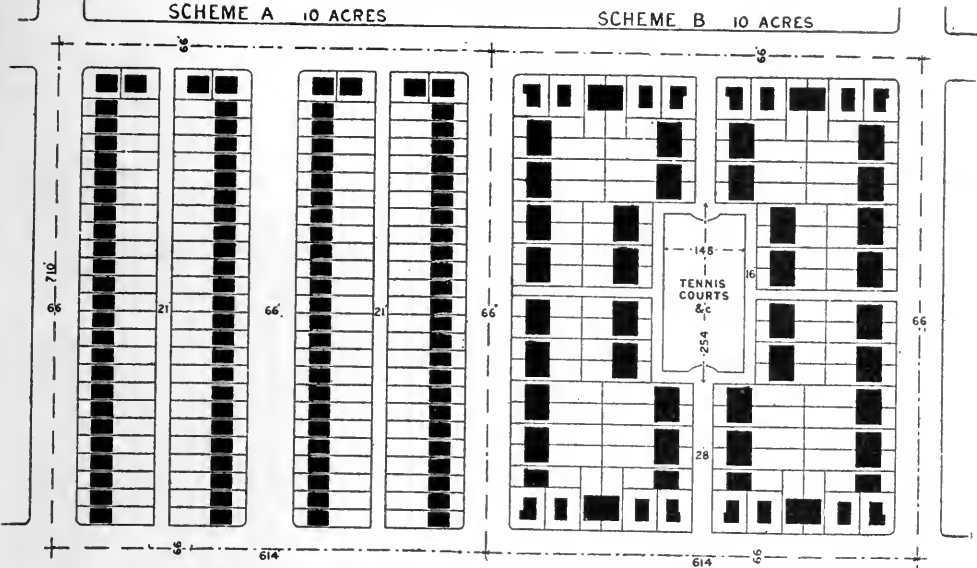
AN interesting number of *Town Planning and Conservation of Life* gives an account of four alternative plans for the development of a 10-acre tract. The four schemes are illustrated on the opposite page, and will probably suggest other

practical plans for effectively subdividing small urban tracts.

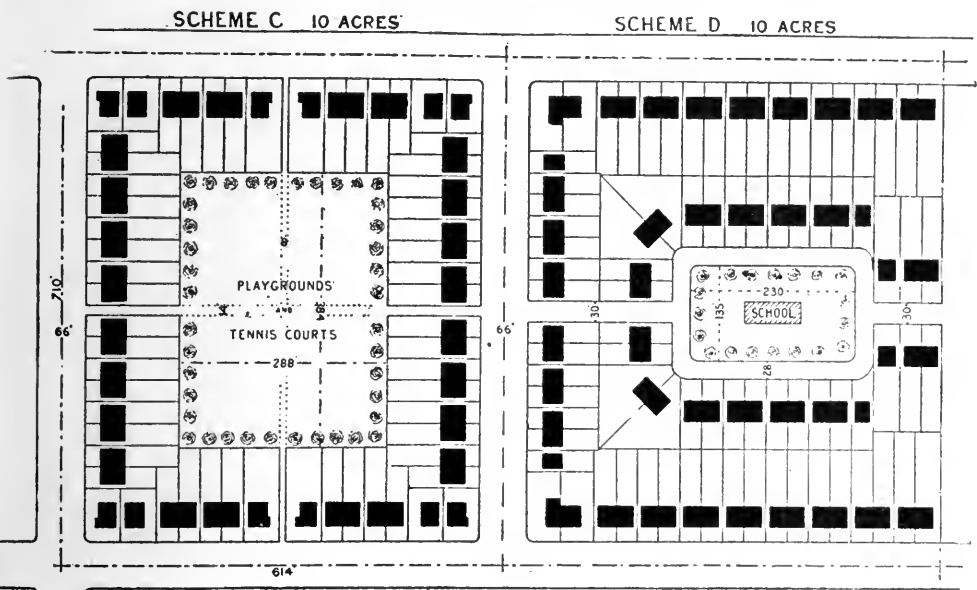
The following table shows the relative figures for the four plans, including the number of lots obtained by subdivision, lot areas, and costs.

	Scheme A	Scheme B	Scheme C	Scheme D
Area.....	10 acres	10 acres	10 acres	10 acres
No. of lots.....	104	92	60	82
Average size.....	2476.9 sq. ft.	3631 sq. ft. (inc. open space)	5786.5 sq. ft. (inc. open space)	4162.8 sq. ft. (inc. School lot)
Average frontage.....	26.4	33.4	34	32.5
Est. cost of land.....	\$10,000	\$10,000	\$10,000	\$10,000..
Est. cost of streets, service, etc.....	\$35,548	\$26,736..	\$20,748..	\$23,533..
Approx. cost per sq. ft. of lots.....	17.6c	10.9c	8.8c (inc. open space)	9.8c
Average cost of im- proved lots.....	\$438	\$399 (inclusion of cost of open space)	\$512 (inclusion of cost of open space)	\$408 (inclusion of cost of school lot)

ALTERNATIVE SUB-DIVISIONS



ALTERNATIVE SUB-DIVISIONS



The cost of the land is the same in each scheme. The cost of local improvements varies with the different systems of planning. Scheme A is typical of Canadian cities. In the other schemes most of the houses are shown in pairs. The saving in road space in Schemes C and D, increases the size of the average lot over what is obtained by a mere reduction in the number of lots. Scheme D represents the development of one-half of a 20-acre block and has no street frontage on one side. The interior streets in Schemes B and D are deliberately designed to hinder through traffic.

Waste Steam from Electric Light Plant Provides Heat for Arcade, N. Y.

COMMUNITIES having electric light or other plants in which steam is used as power would profit by studying the experiences of Arcade, a village of 1,300, in Wyoming County, N. Y. Arcade has made a success of municipal ownership and operation of two public utilities. While the plants are not large as municipal enterprises go, their growth and development show in a striking way what can be done along this line by a community, large or small, proceeding carefully and acting upon sound business principles.

The utilities are lighting and heating. Lighting is placed first because in this instance it was an electric lighting plant that was first put into operation, a heating plant being added to utilize the steam back of the lighting plant after it has performed its initial function of generating electric current. For many years this steam was waste. The utilization of this waste, placing the nose of the exhaust pipe underground and distributing the steam to serve virtually every business place in the village, is the achievement that reflects greatest credit upon the village boards and the administration of the electric light system, now the combined light and heat plant of Arcade.

The dual plant not only conserves several hundred tons of coal during every winter month, but also accomplishes these important things:

Reduces the fire hazard in individual buildings and thus lowers the insurance rate.

Does away with the dust and dirt incident to the operation of basement heating plants in stores and office buildings.

Relieves the community of anxiety over a shortage of coal for domestic consumption.

Furnishes steam heat to consumers at a cost about equal to what they formerly paid for fuel, not counting the labor involved in individual heating appliances.



THE FIRE HAZARD ON THE NORTH SIDE OF MAIN STREET HAS BEEN NEARLY 100 PER CENT REMOVED BY THE COMMUNITY HEATING PLANT

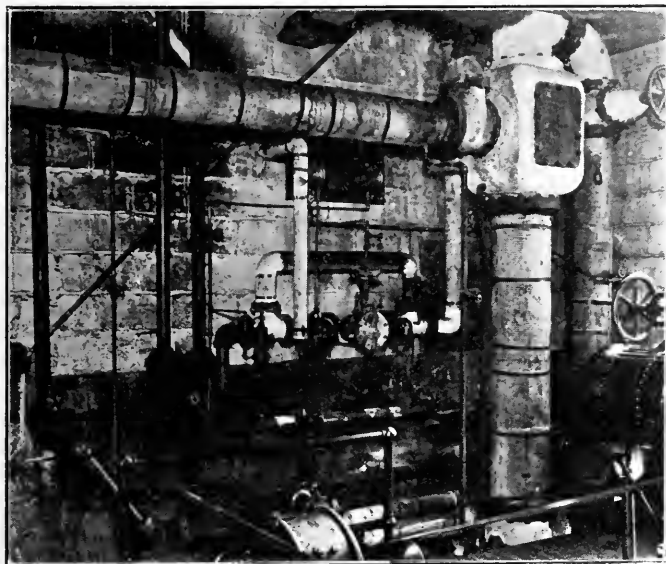
Finally—and this is more important to the engineering than to the lay mind—the condensation is brought back from the street mains to the electric plant through a return pipe, furnishing distilled water for the boilers to the extent of 75 per cent of the total amount of water used.

The electric light plant was built about thirteen years ago. Like many other enterprises of the sort, it took a good many years to put it on a paying basis, giving the consumers ample current at a rate equal to or lower than it would be furnished by a corporation seeking to pay dividends to stockholders. But it was accomplished. Five years ago it reached the self-sustaining stage. It now furnishes current for lighting the villages of Yorkshire, Sandusky and Delevan, all within a radius of five miles of Arcade. Arcade meters and collects in Yorkshire and Sandusky and sells a block of current to the village of Delevan.

One of the difficult problems facing the electric light administration was to get an evenly balanced load over the 24 hours. The first users, of course, brought the peak of the load from early evening until midnight. A knitting mill was induced to install electrical equipment and become a customer of the city, and a vigorous campaign of education in the use of things electrical

resulted in the installation of a considerable number of electric ranges, irons and other domestic equipment. The result was a fair distribution of load throughout the day and night.

As the electric light plant grew and took on new customers at home and in the adjacent villages, it became necessary to install a duplicate boiler system to provide against emergencies. When the plant enlargement proposal was taken up by the village board the heating plant idea was injected by its supporters. A representative of a steamfitters' supply house who happened to be on the ground in connection with the alterations at the electric light station heard of the situation and volunteered to have one of the firm's engineers make a survey without cost to the community. The proposal went to the taxpayers, and the board was authorized to issue bonds to the extent of \$12,000 for the installation of steam mains on the north side of the main business thoroughfare, which is nearest to the electric light station. The contract for the installation of the steam distributing plant was awarded and work was begun in October, 1920. The first consumers were highly pleased with the service, and it was not long before business places began to ask for an extension of the main.



THE SMALL ADDITIONAL PIPING FOR THE COMMUNITY HEATING SYSTEM, WITH THE REGULATING VALVES, IS SHOWN IN THIS ILLUSTRATION

Heating the New Village Schoolhouse

The village had voted to spend \$100,000 for a new school building, but construction was delayed because of the high bids submitted. The old school, a three-story frame structure, had no less than six fires in the basement under various systems of heating, direct, hot air and hot water. They were expensive and inefficient, and, because of the fire risk, use of the third floor was forbidden by the fire underwriters, compelling the Board of Education to spend over \$900 a year for quarters outside the school building.

Architects for the new building were consulted to find out what sort of indirect heating coils were to be used in the proposed new schoolhouse and to learn whether it would be possible to install them in the old building and remove and use them in the new schoolhouse when the time came to build.

It was found that such a plan was feasible. So the proposal to take care of the south side of Main Street was coupled up with the schoolhouse heating plans, and the taxpayers voted to authorize another bond issue of \$12,000 to cover the expense. This year the extension of a main to the south side was completed and another main was carried across the street to the old school-

house, in which the new heating system will be ready before snow flies. The hot air furnace equipment removed from the school buildings included built-in boxes with wooden frames for the reception of the pipes. These box frames were found to be very dry, and in some cases charred, so that a fire threatening life and property loss had been likely to occur.

Last winter, partly because of the mild weather, only about one-third of the exhaust steam was used. This winter, with 24 taps for buildings of all sizes and the schoolhouse, there still will be more than

enough from the engine exhaust to furnish first-class service.

Provision has been made to continue the steam heating part of the plant in the event of an accident or any other contingency involving a temporary shutdown of the electric light station. A direct-feed pipe connects the boilers with the mains, through which live steam can be sent when the supply from the exhaust is cut off or runs too low. This direct steam service also will supplement the exhaust flow during extremely cold weather. The piping requirements which permit of the automatic supply of exhaust or live steam, as may be desired, necessitate no extra room. Should emergency arise, all steam valves are immediately available to the engineer, being within a few feet of the engine valve.

The \$24,000 bonds which cover the entire cost of the steam distributing part of the plant carry an interest charge of \$1,440 a year. The revenue from the present number of steam service customers is sufficient to pay the interest and retire the bonds at the rate of \$2,000 a year. In a few years, therefore, the plant will have paid for itself and become a revenue-producer for the municipality, at the same time giving an eminently satisfactory heating service to the entire business part of the village at a cost below what individuals and firms had been paying for fuel. And the school building will be comfortably heated, the fire risk immeasurably reduced, and the three floors open for use. This third floor of the frame school building having been idle for a number of years because of the order of the State Fire Commissioner, it is noteworthy that the cost to the School Commissioners for rented premises has, by the



THE STEAM MAIN FROM THE ARCADE POWER-PLANT TO THE SCHOOL BUILDING

introduction of central heating, been entirely eliminated.

Another important result will be the great reduction of fire risk in the business section.

Ultimately Arcade's steam plant, using what for years had been a waste product, will produce a revenue of between \$5,000 and \$5,700 a year for the village treasury, it is estimated, and there will be no long-term bonds for future generations to pay.

The members of the present village board of Arcade are D. C. Bentley, Assistant Cashier, Citizens Bank of Arcade; L. S. Bentley, attorney, and Charles E. Buchman. L. S. Bentley is Village President. L. A. Mason is Clerk of the Board.

The Case Against Billboards

At the eighth annual Conference of Massachusetts City Planning Boards, at Winchester, the Speaker of the Massachusetts House presented the case against billboards. His points may serve as a foundation for the arguments of cities and towns in other states. They are: fire risk, harboring of filth, hiding of criminals and immorality, wind hazard, danger to traffic from the very fact of their taking the driver's attention

from the road, breeding of insect pests, depreciation of taxable real estate values, ugliness, and impairment of the value of public improvements, such as parks and scenic highways.

In many places effective action has been taken eliminating billboards from the limits of the rural public ways. This is a step in the right direction, and indicates unmistakably the trend of popular sentiment.

Forward Steps in Municipal Affairs

Recreation Departments

A Community Christmas Tree

SALT LAKE CITY, UTAH.—This year the city square in Salt Lake City will be the scene, for the fifth time, of the live community Christmas tree.

In a large area set with native trees

stands one large fir, transplanted years ago from the mountains. Each Christmas it is gayly lighted and decorated, and the surrounding area is fenced off with holiday colors and Yuletide wreaths, about which the snow is trodden by thousands as they gaze with joy at this symbol of community cheer and promise of good will to men.

Last Christmas a new fall of snow made the tree a glamor of crystal loveliness in a setting of pure whiteness. As the lights were switched on, came the carollers. In



THE COMMUNITY TREE IN SALT LAKE CITY IS A BEAUTIFUL EXPRESSION OF THE CHRISTMAS SPIRIT

large, lighted busses sixty singers from Salt Lake's Oratorio Society were carried from corner to corner, where they bade the passers-by pause and join in a carol. Then after a dozen or more stops they drove, singing, into the city square and encircled the tree. They sang, and all the crowd sang. As they departed they left behind a Christmas cheer on every lip.

The plans for the present year contemplate the redecoration of the same tree, the Oratorio Carollers, the Community Orchestra and the Boy Scout Band. Since the weather does not permit prolonged outdoor programs, the plan this year includes, in addition, a free Christmas production in the Little Theater by the Players Club or the University Dramatic Club. The great finale of the holiday season comes with the annual community production of Handel's Messiah by the Salt Lake Oratorio Society under the direction of Squire Coop. This New Year's Day rendition is given in the large tabernacle that will seat 10,000, and at the small fees of 25 and 50 cents. The 200 singers and the director give their time as a community service, the building is furnished free, and the only expense incurred comes from soloists brought from out of town and for the orchestra. It has been the ambition of the Recreation Department to develop a Community Orchestra that will eventually be able to do justice to such a rendition.

CHARLOTTE STEWART,
Supervisor of Recreation.

Public Welfare Departments

Toledo's Experience with Poor Relief

TOLEDO, OHIO.—The poor-relief problem has been a very perplexing one for Toledo throughout the present year.

The original appropriation for relief for 1921 was \$20,000. This amount was exhausted before the end of January. Since that time repeated appropriations have been made, until at present a total of \$135,000 has been appropriated for this purpose. By the close of the year this will have been increased to \$150,000.

Along with the financial difficulties involved, there have been frequent complaints against the method of administration. The procedure followed in Toledo is this: The investigations are all made by the Social Service Federation, a private agency. By arrangement with the Department of Public Welfare and the Division of Purchases, the Federation orders the provisions from the grocer, and at the same time sends duplicate orders to the city. At the end of the month the grocer bills the city, and the bills are paid after being checked with the orders.

In placing the order for food, the Federation follows a system worked out by dietitians on the staff, by which a week's supply of various foods is computed for families of varying sizes. The family is allowed a choice of cereals and of other foods where possible.

This system provoked no particular complaint until the city decided to put into effect the work test which the state law requires. When a man had to work for the food received, he became more critical concerning that food. Immediately complaints began to be received that poor meat was being delivered, that oleomargarine was bought instead of butter, that yellow cornmeal was furnished instead of white cornmeal. "Ma chillun can't eat yella cawnmeal," protested a colored gentleman before a committee of Council that was investigating these complaints.

Along with these grievances the recipients of relief demanded that if they were to work for their food they should be paid in cash. Since the city was allowing them food at the rate of 55 cents per hour for their time, and the highest rate for common labor in the city recently has been 30 cents, it was evident that payment in cash would merely bring down upon the city a swarm of applicants for relief.

As a compromise measure, the Council asked the Welfare Department to give applicants for relief an order upon a grocery for food worth a fixed amount of money. This was tried out for a time with very unsatisfactory results. It was found that where the amount of money allowed had formerly provided a week's supply of food, it was, under the new plan, exhausted in the middle of the week and the family was applying for an additional order. Families

would order, for example, expensive steak cuts, a practice which of course would soon exhaust the credit allowed. This plan was therefore abandoned.

The work test itself was abandoned for a few weeks during the summer. The effect of that experiment was equally interesting. It was followed immediately by an increase in the number of applicants for relief. The work test was resumed after the provisions of the state law were pointed out. Now the agitation for payment in cash has been renewed.

The renewal of complaints against the relief administration, coming at a time when considerable publicity was being given to the unemployment situation, contributed to a condition in which independent relief movements were springing up throughout the city. Community organizations were being formed, to investigate with volunteer aid the circumstances of needy families in the neighborhood and to provide such relief so far as possible. Every church in the city formed a relief committee, likewise every parent-teachers' organization, every community club, every lodge.

At the same time the Salvation Army came to the front with free lunches of "hot dog" sandwiches, coffee and doughnuts, served on the street corners. After a week they came to the City Council with a story of feeding 8,000 men for some \$50 outlay, and asked the Council to equip a number of soup kitchens to be operated by them with money raised from contributions.

In the midst of all this confusion the recommendation of the National Conference on Unemployment for coordinating the relief activities in each city came as an unadulterated blessing. Never before in Toledo's history was there so great a need for coordination of effort.

Mayor Cornell Schreiber has organized a local commission comprising a committee on employment bureaus, a committee on relief, a committee on public work, a committee on private work, and a committee on recreation, and there are hopes that these groups will unify and harmonize the activities along those lines.

The functioning of the new relief measures will be described in the next issue of THE AMERICAN CITY.

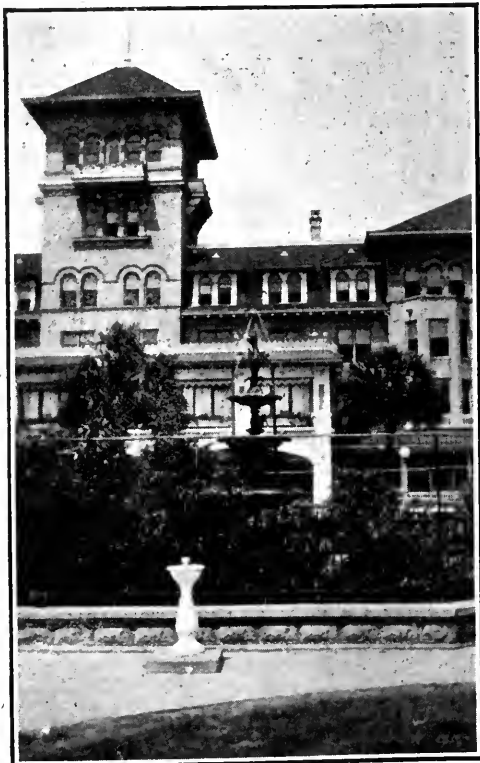
WENDELL F. JOHNSON,

Secretary, Commission of Publicity and Efficiency.

Health Departments

City Drinking Fountains in Jacksonville

JACKSONVILLE, FLA.—Twenty-five drinking fountains have already been installed on the most prominent corners in the business district in this city, with others in stock for future installation. More will be needed to supply the demand. How the people got along without them in the past is a mystery, but that they now fill a long-felt want goes without saying. The drinking fountain has opened a new field of philanthropy; memorials by endowment funds are being given, and the accruing interest is going to pay for the ice to cool the water for the weary passer-by. Already Jacksonville has been provided with a fund by Dr. Payne amounting to \$2,500 to be invested in bonds, the



ONE OF THE MANY ATTRACTIVE BUBBLE
FOUNTAINS RECENTLY INSTALLED IN JACK-
SONVILLE, FLA.

interest to be used in icing the fountain in Hemming Park.

In several other parks in this city these fountains have been installed also. Perhaps the first one to be installed here was given by the members of the church at the corner of Hogan and Adams Street. It bears a sign, "In the name of Christ," with a picture of a cup just above it.

The public schools are all provided with drinking fountains, even those in the country where potable water can be supplied.

The fact that these fountains have become necessities on the street corners has been the means of spreading the idea, and hundreds of persons have had drinking fountains installed in their homes.

C. O. LANGSTON,
Inspector of Plumbing.

Public Safety Departments

School Publicity to Prevent the Breaking of Street Lamp Globes

ROCHESTER, N. Y.—The Rochester Gas and Electric Corporation, Rochester, N. Y., has found that the number of broken street lamp globes has increased from year to year until the loss now approximates \$17,000 a year. The company has made every effort

to reduce this loss by the use of strong globes and secure fastenings, and it is estimated that fully one-half of the total breakage is due to mischief and careless driving. It is believed that this can be reduced only with the coöperation of the public.

With this idea in view, educational literature was prepared and distributed throughout the public schools, so that every pupil could appreciate the money cost and damage to life that result from broken globes. A poster drawing, reproduced herewith, resulted from a contest conducted by the Mechanics Institute in which the mischievous breakage of globes was opposed. Prizes were given by the company for the best three posters. The winning poster, by Roy Miller, shown above, entitled "It's Not Fun," was reproduced in full color on $7\frac{1}{2} \times 5\frac{1}{2}$ -inch posters for distribution among the school children of Rochester.

While the plates and run of 60,000 impressions of the poster were being made, the school authorities planned to devote a definite time throughout all the schools to this phase of civic instruction. Distribution of the posters was made so that this lesson was assigned for Friday, June 3. The reverse side of the poster carried the message below, from the Rochester Gas and Electric Corporation, and formed a nucleus about which the teachers' lesson could be built:

BREAKAGE OF STREET LAMP GLOBES

This poster received the winning prize given by The Rochester Gas and Electric Corporation in a contest conducted by Mechanics Institute.

It illustrates unnecessary suffering caused by the mischievous breakage of street lamp globes. The company desires through it to arouse interest so that globes will not be carelessly broken.

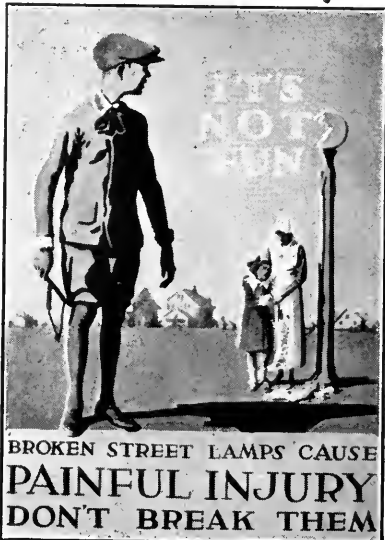
Many of the city's street lights require globes, which protect the lamp, spread the light and improve the appearance of the pole.

Broken globes are dangerous and cause serious injuries to children, adults and animals. They also cut and ruin rubber tires. Unlighted lamps cause accidents, and encourage the activities of rowdies, thieves and burglars. Broken globes add to the expense of street lighting. To replace those broken in 1920 cost over \$17,000, at least one-half of which was due to mischief and careless driving. The other half was due to breakage by the wind.

The company is doing its part to provide good globes and to fasten them securely. Drivers should be careful not to drive into lamp poles. Boys should remember that "It's not fun" to injure others, to cause accidents and to destroy property.

REMEMBER—Any street lamp or fallen wire may have a dangerously high voltage, and many persons have been killed through climbing poles and touching fallen wires. **LEAVE THEM ALONE!**

Perhaps no more opportune time could have been selected for the campaign than the last week of school before the summer vacation months. That the campaign will be successful in reducing the number of lamp



Courtesy of Electrical World.
**THE PRIZE WINNING POSTER NEEDS
NO EXPLANATION**

globes broken through mischief is attested by the hearty coöperation promised in class letters received by the company and in letters from a large number of the school children.

H. S. WEET,
Superintendent of Schools.

Park Departments

A Complete and Unified Park System

ST. PAUL, MINN.—This city owns five landscape or scenic parks—Como Park, 425 acres; Phalen Park, 487 acres; Indian Mounds Park, 77 acres; Cherokee Heights Park, 67 acres; and Riverside Park, 177 acres. Besides these extensive park areas, the city owns 25 neighborhood parks, the largest of which are Linwood Park, 19 acres; Newell Park, 10 acres; Langford Park, 9.5 acres; Merriam Terrace Park, 8 acres. Situated right in the heart of the city are Rice Park, 1.5 acres; Smith Park, 2 acres; Irvine Park, 3.5 acres; Central Park, 2.5 acres; Summit Park, 1 acre, and, in a commanding location on Summit Avenue, one of the finest residence streets, Sum-

mit Outlook Park, with an area of $\frac{1}{2}$ -acre. The others are side-hill terraces and street intersections, located throughout the city.

Two of our parks are popular lakeside resorts, especially Phalen Park, where 1,500 canoes and rowboats are employed to satisfy the demand for aquatic recreation. A bathing beach 200 by 600 feet and a modern bath-house, constructed out of concrete and brick, with locker facilities for 2,000 bathers at one time, are maintained on the park lake. The lake is spring-fed, maintaining a constant outflow of water from this 200 acres of lake surface. Baseball grounds, tennis courts and an 18-hole golf course, also eight weeks of open air concerts during the season, make this park peculiarly interesting.

Como Park, which boasts as its chief attraction its floral allurements and large conservatories, is of quiet rural beauty and has playfields for exercise and recreation, and aquatic sport on its 100 acres of park lake.

The large parks are connected by parkways, which, while not entirely completed, are in good condition to be traveled.

Our park system unites diverse elements into one harmonious whole. The parks differ widely from each other; each has a distinct natural character adapted to specific uses; each supplies something which the others lack.

FRED NUSSBAUMER,
Superintendent of Parks.



1,500 CANOES AND ROWBOATS ARE WELL EMPLOYED AT PHALEN PARK, ST. PAUL

Schoolhouse Fire Losses Increasing

Fire-proof Construction Throughout Should Be Required to Protect Life and Property

SCHOOLHOUSE losses have been unusually heavy this year, and the belief is increasing that insurance rates on schoolhouses have not been advanced to an extent in keeping with the increases in hazard. The modern schoolhouse, although it may have superior construction, involves many new risks. Manual training departments practically bring the factory hazard into the buildings in which large numbers of children are housed. Kitchens are provided for the domestic science department and for the serving of meals to the pupils. Moving picture machines are in general use for educational purposes and entertainment, and the chemical and physical laboratories all present serious fire hazards. In addition, there is the increased use of school buildings as social centers for parties and dances and public meetings, involving the cigar and cigarette hazards.

One prominent company reports that for the past five years its loss ratio on brick buildings has been 65 per cent in protected towns and 115 per cent in unprotected towns. On frame buildings the loss ratio was 138 per cent in unprotected towns. On contents the loss ratios were 64 per cent for brick protected, 76 per cent for brick unprotected, and 116 per cent for frame protected. Many other companies have an equally bad schoolhouse record.

At the recent meeting of the Illinois field men there was considerable discussion over the advisability of making co-insurance mandatory on public school buildings and increasing the credit for the use of the clause on such risks. It was brought out in the discussion, however, that the rating authorities are not in favor of making co-insurance mandatory on public property. Wide differences of opinion developed in the discussion, most of the field men reporting that the loss ratios on school property were excessive and that there should be an increase in rates instead of the decrease which was contemplated by the proposition to increase the co-insurance credit. Those

favoring the change argued that most of the new school buildings that are being erected are of superior construction so far as walls and floors are concerned, but usually have combustible roofs. For this reason many school boards carry only enough insurance to cover the burning of the roof and other light losses. To correct this situation it was recommended that co-insurance be made mandatory, but with an increased credit. The opposition contended that where there was one new school building of superior type there were fifty old ones which would get the same class credit, and the disputants were unable to agree as to the proportion of combustible and non-combustible school buildings.

80 Per Cent of Our Schools Are Fire-Traps

This question is answered by a recent publication of the National Fire Protection Association, showing that of all the school buildings in the country only 5 per cent are of Type A, constructed entirely of fire-resistive materials. Thirteen per cent are of Type B, with fire-resistive construction as to walls, floors, stairways and ceilings, but with wood or composition floor surface, and wood roof construction over fire-resistive ceiling. Seventeen per cent are of Type C, with masonry walls and fire-resistive corridors and stairways, but with combustible floors, partitions, roofs and finish. Forty-four per cent of the school buildings are of Type D, with masonry walls, but otherwise with ordinary joist construction and wood finish. Twenty-one per cent of the schools, including the old-time country schools, are of Type E, with wood construction. This shows that 80 per cent of the schools are fire-traps, in spite of the numerous warnings which have been given on the dangers of such construction by serious losses of life. Little children are entitled to every possible protection, and fire-proof construction should be required by law for every school building that is more than one story high.

The New North Denver Storm Sewer

Construction of Twin Section and Brick Sections Progressing Rapidly

WORK on the North Denver storm sewer district No. 2 has now reached the stage when the magnitude of the operation is appreciable, even to those not familiar with this kind of city development. Three trench-digging machines are being used for the work, and on August 1 practically all of the lateral sewers had been laid. The project, however, will not be entirely complete before January, 1922.

This storm sewer district is the largest project of its kind ever undertaken by Den-



LAYING THE TWO-RING BRICK STORM SEWER



THE KEYSTONE DIGGER AND REFILLER IN ACTION

ver. It provides for the drainage of an area the outside limits of which are West Thirty-fourth Avenue and West Forty-fourth Avenue, the railroad tracks and Lowell Boulevard. It will drain an area of 1,200 acres and will cost completed \$513,692.06. It will require 20 miles of various size pipes and conduits, ranging from 10 inches to 78 inches in diameter, and approximately 650 catch-basins and 250 man-holes.

The most expensive piece of work is the construction of a twin concrete conduit which empties into a 78-inch 3-ring brick sewer, which in turn crosses the railroad tracks and discharges into the Platte River. The cost of this twin conduit is \$30 per foot. Both the twin conduit and the 3-ring brick sewer carry 420 cubic feet of water per second. The twin conduit is an ingenious arrangement to carry water across a low, flat area. The land is so low at this point that a circular sewer would have stood several feet above the ground. This difficulty was obviated by the construction of a flat twin sewer.



SIXTY-INCH SECTION, NORTH DENVER
STORM SEWER

The size of the brick sewer decreases from a 69-inch circular sewer at West Thirty-fourth Avenue and Lipan Street to 66 inches at West Thirty-eighth Avenue and Quivas Street. At that point the north and south branches join the main trunk sewer. The north branch is a 60-inch circular sewer with a capacity of 200 cubic feet per second, and decreases in 3-inch stages to a 27-inch sewer at West Forty-first Avenue and Federal Boulevard. The south branch decreases from a 45-inch sewer at West Thirty-eighth Avenue and Quivas Street with a capacity of 110 cubic feet per second to a 30-inch sewer with a capacity of 40 cubic feet per second at West Thirty-second Avenue and Irving Street.

The topographical work and design for this sewer were done by Charles A. Davis of the City Engineering Department.

ACKNOWLEDGMENT.—Illustrations by courtesy of Edgar C. MacMechen, Editor, *Municipal Facts*, Denver, Colo.

Old-Time Brick Paving in Lancaster, Ohio

IN the spring of 1888 Lancaster, Ohio, first paved a street, South Broad Street, with $2\frac{1}{2} \times 4 \times 8$ -inch brick on an 8-inch local gravel base and a $1\frac{1}{2}$ -inch sand cushion with bituminous filler. Neither the gravel base nor the sand cushion was rolled, but the bricks were placed on the loose base and rolled with a wooden roller weighted down with pig iron. This street has had probably the heaviest traffic in the city, as all of the freight for several large manufacturing concerns, one a foundry, has been hauled over it for the last 33 years.

All of the traffic seems to have kept on a beaten path, much as it does on a country dirt road. This was owing to the fact that a street car track divides the roadway down the center, and also because, following the early practice, the crown was built unnecessarily high. This tracking in one path tended to centralize rather than distribute the weight, impact, wear and tear. As a result, the foundation as constructed proved unequal to the task, and the pavement became rough in the traffic tracks.

Repaving was ordered. The street was torn up and it was found that many of the bricks in the traffic tracks were worn down, in some instances to not more than an inch

in thickness, and were still unbroken. It was also discovered that a great many of the brick were still in excellent condition, and these were ordered piled up along the streets. Very soon came a demand for the old brick to pave alleys, and these bricks were furnished to property owners who would agree to pave any alley at least one block long. There was a scramble for the brick and they were all hauled away before the contractor had time to pile them up, the property owners sending teams and trucks to the street, assorting the brick and hauling them away as fast as they were dug loose.

The property owners employed Carl Garling, a local contractor, to do the construction work, and the City Engineer's department furnished the necessary engineering without cost. Mr. Garling did the work on a cost plus basis, which was prorated on the abutting property according to the frontage of the alley.

The paving was done as follows: A 5-inch rolled gravel base was prepared, then a 2-inch sand cushion and sand filler was used. The rough side of the brick was turned down. With an average of about 1 foot of grading to do, the cost per abutting foot was about 60 cents for a 9-foot alley.

The Selection of Economizers and Feed-Water Heaters for Municipal Power-Plants*

By W. F. Schaphorst, M. E.

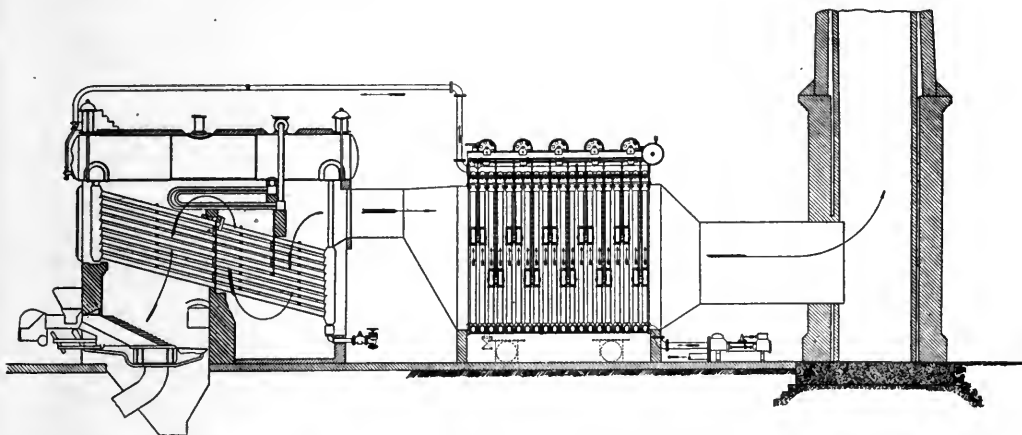
Economizers

THE so-called "economizer" is an apparatus which is placed in the path of the hot flue gases leaving a boiler, for the purpose of absorbing as much of the heat from the hot gases as possible. The heat absorbed is used for heating the boiler feed water before it enters the boiler.

The percentage of heat escaping up a chimney under various temperatures is very considerable. When 18 pounds of air is

and using the heat in the chimney gases after they leave the boiler, to heat the feed water before it enters the boiler, a large part of this heat may be saved.

"Economizer" is not as good a name as "flue feed-heater" would be, but the term "economizer" has been used so much that it will probably always be used. Feed-water heaters, superheaters, boiler-feed regulators and many other devices are "economizers" as much as is the economizer, consequently



Courtesy Green Fuel Economizer Company

SECTIONAL DRAWING SHOWING HOW AN ECONOMIZER IS INSTALLED, AND SHOWING THE "COUNTER-CURRENT" PRINCIPLE OF GASES AND WATER TRAVELING IN OPPOSITE DIRECTIONS TO INCREASE EFFICIENCY

used per pound of combustible in the fuel (representing forced draft conditions), the loss varies from about 12 to 23 per cent between 450 and 800 degrees Fahrenheit respectively. With natural draft stoker conditions, using 24 pounds of air, the per cent loss varies from 12 to 26 between 350 and 700 degrees. Using 30 pounds of air, average hand firing and natural draft, the per cent loss of heat varies from 12 to 30 between 300 and 650 degrees. These figures represent the temperatures of gases leaving the boilers. Without the use of an economizer this heat would all be wasted, but by applying the "counter-current" principle

the name should not be applied to only one of the methods of economizing.

It is common practice to overload boilers as much as 100 to 200 per cent. With boilers operating above normal, it is easy to understand that chimney gas temperatures will be higher than when operating at normal. There is bound to be more waste, and boiler efficiency is bound to be less unless some means is provided to absorb the waste heat that goes up the chimney. It is the function of the economizer to absorb and utilize this waste heat. Further, the modern tendency is to increase steam pressures. Increased steam pressure means increased steam temperature and consequently in-

* Copyright, 1921, by W. F. Schaphorst.

creased flue gas temperature—another reason why the economizer should be used.

The same over-all efficiency can be attained, to be sure, by installing more boilers and operating them always at normal load. But the same high economy cannot be attained. If it were only a matter of boiler investment, the problem would be simple, but, in addition, more stokers would be required, more stacks, larger buildings, greater operating costs, insurance and interest on investment would be higher, etc. Consequently, the economizer is very essential in modern power-stations.

How the Economizer Economizes

In many instances the economizer has saved as much as 10 to 15 per cent in fuel. For every 11 degrees rise in feed-water temperature there is a 1 per cent saving in fuel. To save 15 per cent in fuel it is therefore only necessary for the economizer to raise the temperature 165 degrees, or from 47 degrees to 212 degrees F., which is possible under certain conditions. By pre-heating the water, the economizer increases the boiler capacity 20 to 40 per cent. It furnishes a large reserve of hot feed water and leaves to the boilers only the work of bringing the hot water to the vaporizing point and generating the steam. The most effective types of economizers bring the feed-water temperature up to the temperature of the steam itself.

The economizer also protects boilers against sudden expansion and contraction due to temperature change when cold water is fed. Leaks are thus minimized and the life of the boiler is prolonged. The water is also purified before entering the boiler, scale being deposited within the economizer itself in a section that is easily cleaned out. This makes the boiler more efficient, more durable, and safer, the tendency to bag being reduced. The economizer, having considerable tube surface and being comparatively cool, catches much of the soot, thus lessening the smoke from the stack. This soot is automatically cleaned from the economizer tubes either with a soot cleaner or with scrapers.

Until recently most economizers have been made of cast iron and many cast iron economizers are still being installed. Cast iron is considered best for low-pressure work—for heating the water up to the lower temperatures.

Wrought-steel tube economizers are now gradually coming into use, being preferable for the higher pressures that are gradually being adopted. The principal objection to wrought steel is corrosion. Cast iron resists corrosion almost perfectly. Wrought-steel economizers occupy less space than cast iron; they cost less; the smaller size tends to minimize radiation and leakage losses; and they transfer heat more readily than cast iron. The steel tubes are about one-half as large as the cast iron tubes, the latter being 4 to 5 inches in diameter. While it is true that corrosion attacks steel more readily than cast iron, remedies are being found to combat corrosion, such as galvanizing, protecting the inside of the tubes with carbon paint, and placing steel turnings in the bottom of the heater.

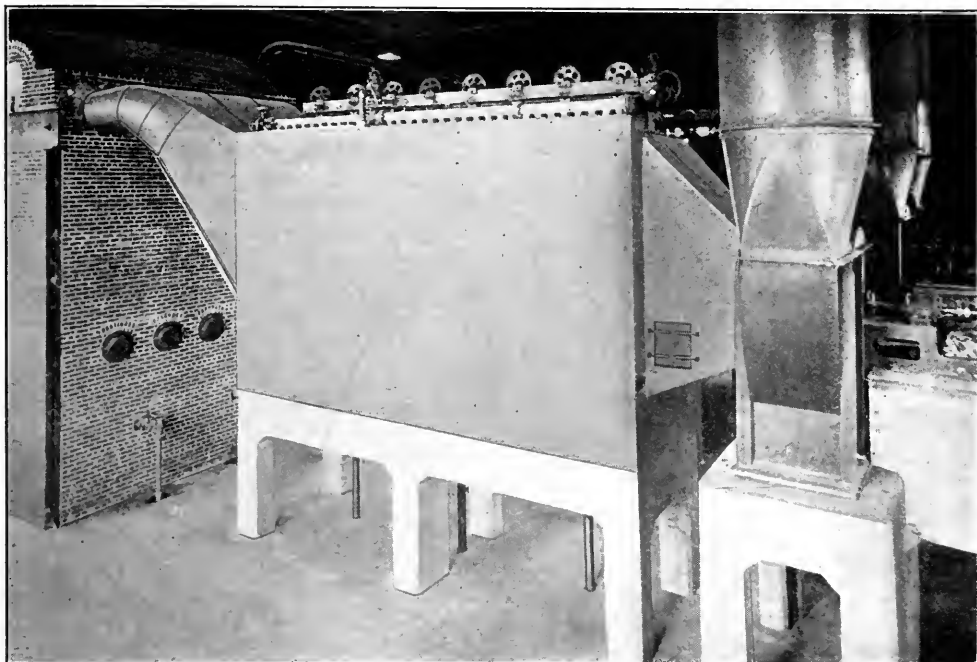
Occasionally combinations of cast iron and wrought-steel economizers are installed. The cast iron portion is under low pressure. The water is then pumped to the high-pressure wrought-steel section, where it is heated still more. From there the water is pumped into the boiler. Although a very economical arrangement, this method has the objection of being somewhat complicated.

Induced-draft fans are generally installed in connection with economizers to make certain that draft will be ample. Since the economizer cools the chimney gases, often to 300 degrees F., there is not sufficient remaining temperature difference to enable a chimney to operate satisfactorily on natural draft in larger plants. With mechanical draft, the intensity of draft is entirely independent of temperature.

When selecting the economizer and fan, care should be taken to see that the fan is ample in size to handle all air, plus an allowance that must be made for air leakage. Although air inleakage should not be permitted and should be eliminated as much as possible, it is well to be safe and figure on at least 50 per cent air infiltration through the boiler and economizer settings.

It is not a simple matter to decide whether or not an economizer should be installed in a given municipal plant. One manufacturer of economizers states that "they are not suitable for boiler capacities under 500 horse-power, because they will not yield an economical return which will warrant the investment."

The same manufacturer, however, in his



AN INSTALLATION OF GREEN ECONOMIZER, SHOWING A BENT TUBE TYPE BOILER AT THE LEFT, ECONOMIZER IN THE CENTER AND EXHAUST FAN AT RIGHT

economizer catalog, shows with "actual figures" that an economizer in a plant of less than 1,500 horse-power will produce more than 50 per cent annually on the investment. The catalog was written several years before the war; conditions have changed greatly. The price of fuel has advanced, but not so much as the price of economizers. It is now claimed that the price of fuel will not drop to pre-war figures, whereas the price of economizers may. These fluctuations, of course, affect the power-plant size limitations. The kind of fuel makes no difference whatever with an economizer. Everything hinges upon the price of the fuel. The higher the cost of the heat units in the fuel, generally, the greater the necessity of an economizer.

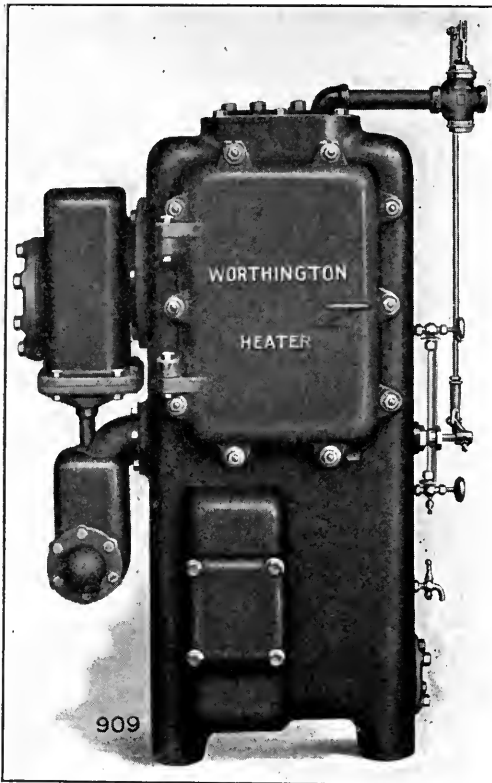
The correct way to decide whether or not an economizer will pay, is to design the entire plant both ways—with the economizer and without the economizer. Then figure how much the total power will cost with and without the economizer. The difference will decide whether or not the annual return due to the economizer will justify its installation. When making these computations, the following factors must be taken into account:

(1) Cost of fuel delivered into the bunkers at the plant; (2) capacity of plant; (3) average annual load; (4) kind and number of boilers; (5) average temperature of gases leaving boilers; (6) heat value of fuel; (7) cost of fuel; (8) average temperature of feed water entering economizer; (9) amount of fuel burned annually; (10) first cost of economizer, fan, connections, etc.; (11) cost of building with and without economizer due to different space requirements; (12) cost of operating economizer; (13) depreciation; (14) cost of maintaining economizer.

Feed-Water Heaters

The feed-water heater is a device that is not sufficiently appreciated. Some power-plant owners seem to have the idea that such heaters are "made to sell" mostly, that they are a "theoretical" addition to the plant rather than a practical addition. The statement is often made in advertisements: "A feed-water heater will save from 10 to 20 per cent of your coal," and the reader or prospective buyer immediately adds his grain of salt.

Like the economizer, the feed-water heater preheats boiler feed. Instead of utilizing waste chimney gases, however, the feed-water heater utilizes the heat in exhaust steam that would otherwise be wasted. The feed-water heater also saves approxi-



TYPICAL OPEN TYPE CAST IRON FEED-WATER HEATER

mately 1 per cent of the fuel for each 11 degrees of increase of feed-water temperature. Thus, if the initial temperature of the boiler feed is 70 degrees F. and the feed-water heater brings the temperature up to 200 degrees F., we have an increase of 130 degrees F., equivalent to a saving of about 11.8 per cent of the fuel bill.

In non-condensing plants exhaust steam from the main engines is generally used for doing the heating. In condensing plants the exhaust from auxiliaries is utilized to reheat the exhaust steam from the main engine after having been condensed. There is always a loss of water, to some extent, in condensing plants, requiring the use of a small percentage of fresh or "make-up water." This make-up water, also, is passed through the feed-water heater with the condensate.

Evaporators have recently come into use in some large power-plants for preheating and preparing the make-up water for the boilers. By means of so-called "multiple effect evaporators" it is possible for 1 pound

of steam to evaporate as much as 8 pounds of water, or even more. In the evaporation process all scale-forming matter is left behind in the evaporators, thus giving the boilers pure distilled water. This is an excellent apparatus. Practically no heat whatsoever is lost. The principal objection to the evaporator method is the high first cost, which does not justify its use in small power-plants.

Advantages of Each Type

There are two types of feed-water heaters—the open, and the closed. In the open-type heater the exhaust steam or steam used for heating comes into direct contact with and intermingles with the water which it heats. If there is any oil in the exhaust steam (and there frequently is), it should be carefully removed before permitting it to enter into the heater. Most open-type heaters are already provided with oil separators, oil skimmers, and filters, thus taking care of the oil problem.

The closed type of heater is much like an economizer in that it is made up of pipes or tubes. The water to be preheated passes through the tubes, and the steam for heating surrounds the tubes. Thus the heat must pass through metal before it can reach the water—a less efficient method than the open-type method.

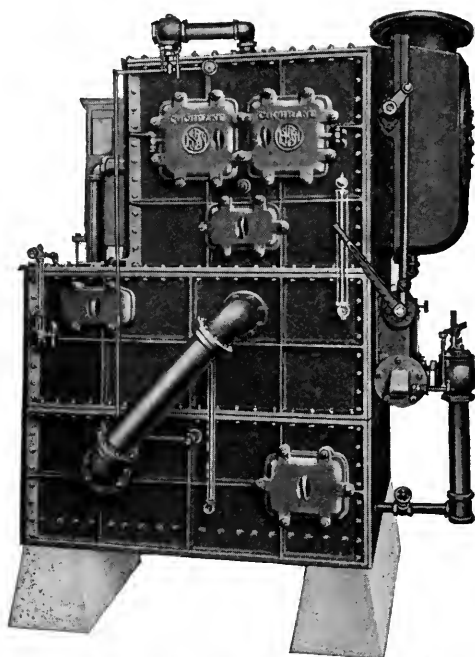
One advantage of the closed type of heater is its ability to use high-pressure steam where it is desired to increase the feed-water temperature to more than 212 degrees F. A disadvantage is the fact that scale lodges within the tubes of the closed-type heater, necessitating occasional cleaning. The open-type heater is more easily cleaned. The open heater, in addition, saves the heat in the condensate from the exhaust steam, while the closed heater wastes it. The closed heater therefore requires more exhaust steam for heating. The open heater will heat the water to a higher temperature than can the closed heater with the same exhaust steam. With the open heater it is common practice to bring the feed temperature up to within less than 3 degrees of the exhaust-steam temperature. The closed type of heater, on the other hand, will not do better than bring the feed temperature up to within 15 or 25 degrees of the steam temperature, much depending upon the cleanliness of the heater and the intimacy

of contact between the steam and the tubes. Sometimes closed heaters become air-bound, rendering them ineffective. Open heaters maintain the same high efficiency year in year out. The open heater also makes itself useful as a catch-all for condensate from heating systems, drips and other supplies from hot water and exhaust steam—an advantage not possessed by the closed heater. For these reasons, therefore, the open type is usually preferable in the modern power-plant and is used much more commonly.

As for the available steam for heating the feed-water heater, this often is a problem in itself, especially in condensing plants. Sometimes, during the light loads, more auxiliary exhaust is to be had than is required. On the other hand, during the heavier loads the amount of exhaust from the auxiliaries is insufficient. In the latter instance it is usually good practice to "bleed" steam from the intermediate stages of the main units to make up the deficient supply. And when there is too much exhaust from the auxiliaries, the surplus can be used by piping it into the proper intermediate stage of the main units.

The Live-Steam Feed-Water Heater

There is another type of so-called feed-water heater on the market which is in a class by itself because it does not use exhaust steam at all. It uses live steam and preheats the water up to the temperature of the steam itself. In this way all scale is deposited within the heater, in easily removed and cleaned trays. It is almost impossible for scale to get into the boiler. This type of heater does not save fuel because of its preheating feature, on account of the fact that live steam is used. If any fuel is saved at all, it is due to the maintenance of continually high boiler efficiency, which is of course a great advantage in localities where feed water is badly contaminated with scale-forming impurities. Another advantage is the protection of the boiler against expansion and contraction troubles caused by boiler feed that would otherwise be cold. This heater operates along the principles of the open-feed heater. That is, the live steam is permitted to make actual contact with the water which it heats. As a heater it is efficient, but it is not so profitable an



A COCHRANE METERING FEED-WATER HEATER OF THE BACK-PRESSURE TYPE WITH VALVE STACK SEPARATOR

investment as is the regular open-type heater which utilizes exhaust instead of live steam.

In writing to manufacturers for prices or other information, it is well to give them all principal data, as follows, so that they can reply intelligently: (1) Number, kind and size of boilers. (2) Weight of exhaust steam available in pounds per hour. (3) How many pounds of exhaust steam are used per hour in heating or drying systems? (4) What back pressure, if any, in pounds per square inch is carried in the exhaust? (5) What is the source of water-supply—lake, well, river? (6) What is the pressure of water-supply in pounds per square inch? (7) What is the average initial temperature of water-supply? (8) Are you troubled with scale in your boilers? If so, is it hard or soft? (9) Send an analysis of the water used for feed, if you have an analysis. (10) Send a sketch showing layout of engines and boiler plant, principal pipe connections, etc.

(The next article in this series will discuss super-heaters)

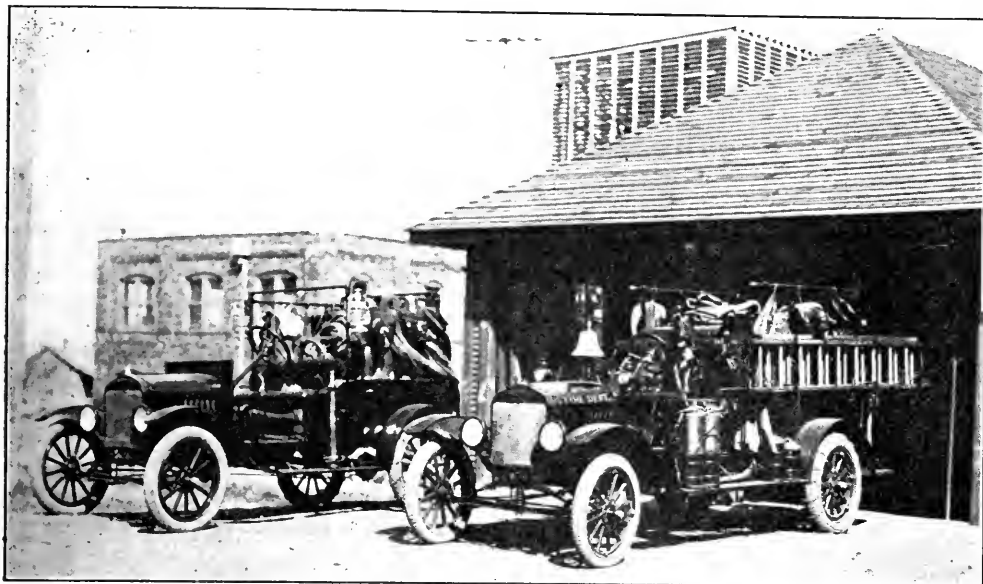
Gasoline-driven Tractors, Trucks and Cycles Are Made to Serve All Municipal Departments



A BATES STEEL MULE HAULING A NEW WESTERN BLADE GRADER

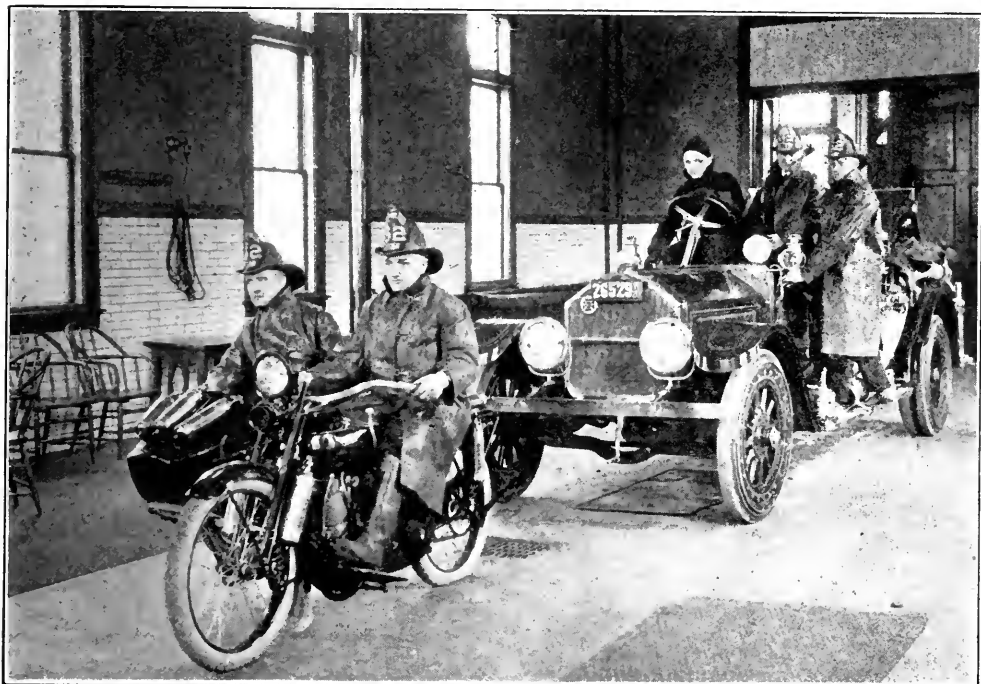


ONE OF A DOZEN 2-TON POWER DUMPING WHITE TRUCKS EQUIPPED WITH WATER-TIGHT BODIES, USED IN GARBAGE COLLECTION SERVICE, CLEVELAND, OHIO



THE FIRE-FIGHTING APPARATUS OF THURBER, TEXAS

At the right is shown a Childs combination outfit, equipped with large chemical tank under the seat, pump and suction hose. About 1,000 feet of hose is carried on this truck. The machine at the left carries a 30-gallon Badger soda and acid chemical tank, mounted on two wheels. In addition to the tank, this machine carries 400 feet of $2\frac{1}{2}$ -inch hose, and also hats, boots and coats for 6 men. The photograph and information were furnished by C. C. Patterson, Chief of the Thurber, Texas, Fire Department



THE LIGHT HARLEY-DAVIDSON MOTOR-CYCLE AT THIS FIRE STATION IS ABLE TO REACH A FIRE AHEAD OF THE SPEEDY FIRE TRUCK AT THE RIGHT, THUS FREQUENTLY SAVING THE PRECIOUS SECONDS THAT MEAN MUCH IN FIRE-FIGHTING

Chamber of ***** Commerce Activities in Public Affairs

Children Help to Clean Up Martinez

MARTINEZ, CALIF.—The Martinez Chamber of Commerce has recently completed a successful clean-up and de-fence campaign. Martinez has a population of about four thousand.

The town was divided into twenty districts with three chairmen to each district, a man, a woman and a Boy Scout. These chairmen selected two captains for each block in their district, one a boy or a girl and the other an adult. Each of the block captains then organized a committee to assist during the clean-up week.

Special literature was distributed by the block captains to everyone in their territory, urging them to clean up the attic and the basement, tear down or whitewash old fences, trim shrubbery, burn grass from vacant lots, and gather all rubbish and have it hauled away. This literature was sent from headquarters to the block captains, and they delivered it in person to their neighbors. Another feature of the educa-

tional campaign was a daily statement in the newspapers by prominent citizens urging every one to clean up. This was started by a proclamation of the Mayor two weeks prior to the campaign. The city kept garbage wagons busy the entire week of the campaign, hauling away the rubbish, free of charge.

A motion picture theater party was given the children participating in the campaign; 800 tickets were distributed among the block captains, who issued them to children after they had cleaned up their homes. The pictures were selected especially for children, and the theater was packed, although children not working in the campaign were not allowed to enter. A boating trip was given the children of the cleanest district at the end of the campaign. This proved a delightful entertainment.

The fire department held a water fight with a fire department of one of the neighboring cities, at which enough money was collected to defray all expenses of the campaign.

The close of the campaign was celebrated



HUNDREDS OF CHILDREN WERE ENLISTED IN THE MARTINEZ CLEAN-UP CAMPAIGN. IN THE PICTURE THEY ARE READY FOR THEIR REWARD

by a dance and a card party in the grammar school auditorium, at which all new school teachers were introduced to the audience and were made to feel welcome in the community.

T. A. STEVENSON,
Secretary.

The Dallas City Plan and the Chamber of Commerce

DALLAS, TEX.—On account of the inability of the city of Dallas to provide funds for its City Plan Commission, the Chamber of Commerce organized the Metropolitan Development Association two years ago "to make Dallas a better place in which to live and work, by preparing and carrying out a rational plan of community growth in co-operation with the City Plan Commission." The financing of the Association was largely done by the Chamber, although many subscriptions for substantial amounts were contributed by local improvement leagues, property owners' associations, noonday luncheon clubs, civic organizations and others interested in city planning. With the organization thus started, George E. Kessler, of St. Louis, was employed as consultant for both the City Plan Commission and the Metropolitan Development Association, and active work was begun.

The city planning field in Dallas had already been prepared by Mr. Kessler in his city plan for Dallas, submitted to the Park Board eleven years ago, but in the eleven years Dallas had increased in population from 92,104 to 158,976, an increase of 72.6

per cent, which proved that the city must prepare for big things in the future through city planning.

The original city plan called for four changes that affected the railroads, for Dallas, like so many other cities, was suffering from the effects of uncontrolled railroad expansion, and the town was divided into many different sections by main railroad lines, switch tracks, and team tracks. These changes were (a) the building of a belt line railroad in two loops, one around that part of Dallas east of the Trinity River, and the other around the area included on the west bank, the two connecting with each other along the Trinity bottoms; (b) the building of a union passenger terminal station along this belt line at the present western terminus of the business section; (c) the building of a freight terminal for local business on the properties near the terminal station and adjacent to the business district; and (d) the elimination of grade crossings in the down-town district.

Three of the four recommendations have been partly carried out, and as time passes it is certain that the others will come to pass. The first project to be completed was the union passenger terminal, in October, 1916, at a cost of \$6,500,000. The second was the completion of the grade separation on the Missouri, Kansas & Texas Railway, in October, 1919, at a cost of \$460,000. The third, which came under Mr. Kessler's first suggestion, was the completion of a part of the belt line from the terminal tracks to the Texas & Pacific Railway Company's main line east of the city limits, during the spring



BEFORE AND AFTER THE TRACKS WERE REMOVED FROM PACIFIC AVENUE, DALLAS. THIS IMPROVEMENT RESULTED FROM ELEVEN YEARS OF AGITATION

King Standards

DISTINCTION

King Trolley Pole Brackets and Ornamental Bases equipped with G-E Novalux fixtures add distinction to any city street by day or night. Our Engineering Department is available to help solve your lighting problems.

King Manufacturing Co.
53 W. Jackson Boulevard, Chicago, Ill.

of this year. This last project made possible the complete elimination of the T. & P.'s main line for a distance of 0.67 miles through the business heart of the city on Pacific Avenue.

Pacific Avenue is an 80-foot street parallel to, and within one block of, the retail and wholesale district. Formerly it provided space for a double track in addition to switch tracks adjacent to the business houses on this street. A heavy grade made it necessary for the east-bound trains to run at full speed through the heart of the city in order to make the summit, a procedure that not only effectively barred business from the north side but also took its toll of lives because all intersecting streets crossed the avenue at grade. Eleven years ago Mr. Kessler proposed the removal of these tracks and a terrific hue and cry arose at the very thought, but on the 30th of June, 1921, these same tracks were removed amidst elaborate ceremonies and much celebration on the part of the committee, whose optimism and undaunted courage and energy had accomplished the track removal.

The Metropolitan Development Association has completed a zoning ordinance for Dallas, which is now in the hands of the city for final passage, after being approved by the City Plan Commission. Other large projects being fostered by this organization are: a major and a minor street plan; a park and parkway system; and the further removal of grade crossings within the city proper. One of the operations, the removal of 3.75 miles of Houston & Texas Central main line and the turning of the right of way into a boulevard with center parking, will not only eliminate 37 grade crossings, but will change the entire character of housing for a distance of approxi-

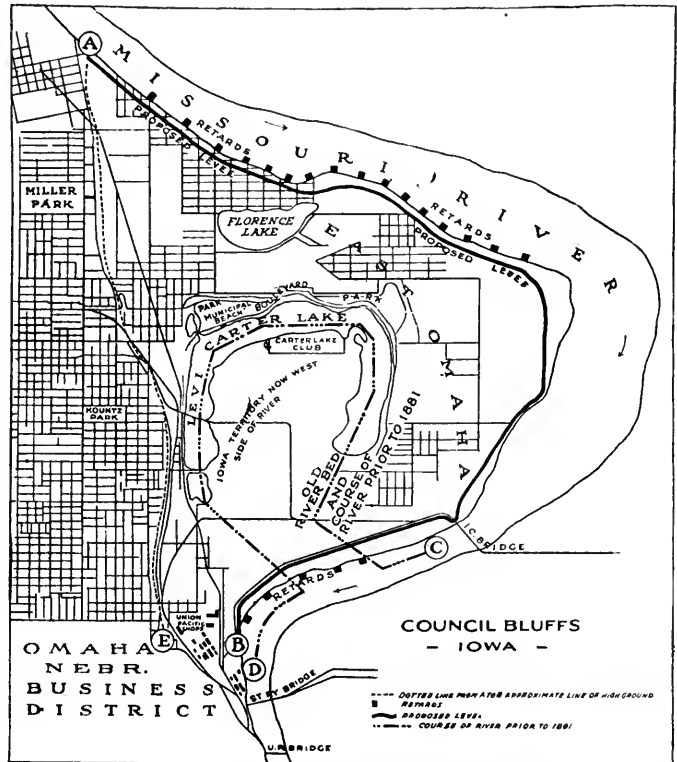
mately four blocks in either direction from the proposed boulevard, making a much desired improvement, and building a monument to city planning that will be of use every day in the year.

In order to facilitate city planning in Dallas, the City Plan Commission has appointed a special committee to prepare a special law permitting the city to control the platting of subdivisions outside of the present city limits.

E. A. WOOD,
Engineer, Dallas Chamber of Commerce.

Water-Front Protection in Omaha, Nebr.

OMAHA, NEBR.—An interesting and important project has been undertaken in Omaha for the purpose of protecting 7,000 acres of valuable bottom-lands from the encroachments of the Missouri River. A portion of this land lies within the city limits and is occupied by manufacturing establishments and railroad yards, but the greater part consists of farm and garden lands, a



THE MAP ILLUSTRATES THE CURIOUS HISTORY OF THE MISSOURI RIVER AT OMAHA



Repair Time

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MUELLER "B" TAPPING MACHINE

here illustrated, embodies all the new **MUELLER** improvements. It will tap and insert corporation cocks from $\frac{1}{2}$ ' to 1'—and will tap **only** up to 2'.

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Mueller Metals Co., Port Huron, Mich., Makers of "Red Tip" Brass Rod; Brass and Copper Tubing; Forgings and Castings in Brass, Bronze and Aluminum; Die Castings in White Metal and Aluminum; also Screw Machined Products.

beautiful lake more than three miles in length, a boulevard and lake park, a municipal swimming beach, and several popular recreation resorts on the lake shore. The initial steps of this improvement, now practically under way, were taken by the Industrial Bureau of the Omaha Chamber of Commerce.

One of the most notable freaks in the history of the Missouri River is the change that it made in its course at Omaha in the spring of 1881. Prior to that date the river, on leaving the high and somewhat rocky bluff above the city of Omaha, ran in the curious meandering course shown on the map on page 499. During the extreme high water of 1881, caused by an ice jam, practically all the bottom-land within this huge circle was submerged; in fact, the water rose to such a height that it was possible to row a boat from the lower business district of Omaha into the heart of Council Bluffs, Iowa, five miles to the east.

The flood subsided almost as rapidly as it had risen, and when it had subsided the Missouri no longer flowed through the horseshoe loop shown on the map herewith as Carter Lake, but had cut across the open end of the horseshoe, shortening its length by about four miles, and presenting the city of Omaha with a beautiful body of water, now called Levi Carter Lake.

While the main area of about 7,000 acres of land has never been entirely submerged since 1881, portions of it have been menaced by high water practically every year. For this reason the Chamber of Commerce felt that something should be done to remove this threat and place the district permanently beyond the reach of high-water damage.

After consulting an engineer, Roy N. Towl, a petition was prepared setting forth the object in view and the conditions under which the organization could be effected. The property owners, after receiving a thorough explanation of the work to be accomplished, voted in March, 1921, almost unanimously to organize a drainage district. A board of directors was organized to carry the work forward.

At this point another difficulty arose. As that portion of the low lands shown on the map and within the Carter Lake Circle is still technically a part of the state of Iowa, it became necessary to get the authorities in Pottawattamie County, Iowa, opposite

Omaha, to which this tract within the circle belongs, to organize a similar protection or drainage district.

The plans for this important improvement and protection work submitted by the engineer call for the installation of retards to prevent the river from further cutting the banks, particularly along the north shore, where great damage has been done by erosion in recent years.

The second step will be the building of a levee shown on the map, by beginning at the point "A" at the top of the map and paralleling the river practically all the way round to the point "B" opposite the business district of the city. It will not be necessary to build this levee very high, but it will have an average height of from 6 to 10 feet, with a width of 20 feet, and a 2 to 1 spread on the slopes.

J. M. GILLAN,
Manager Industrial Bureau,
Omaha Chamber of Commerce.

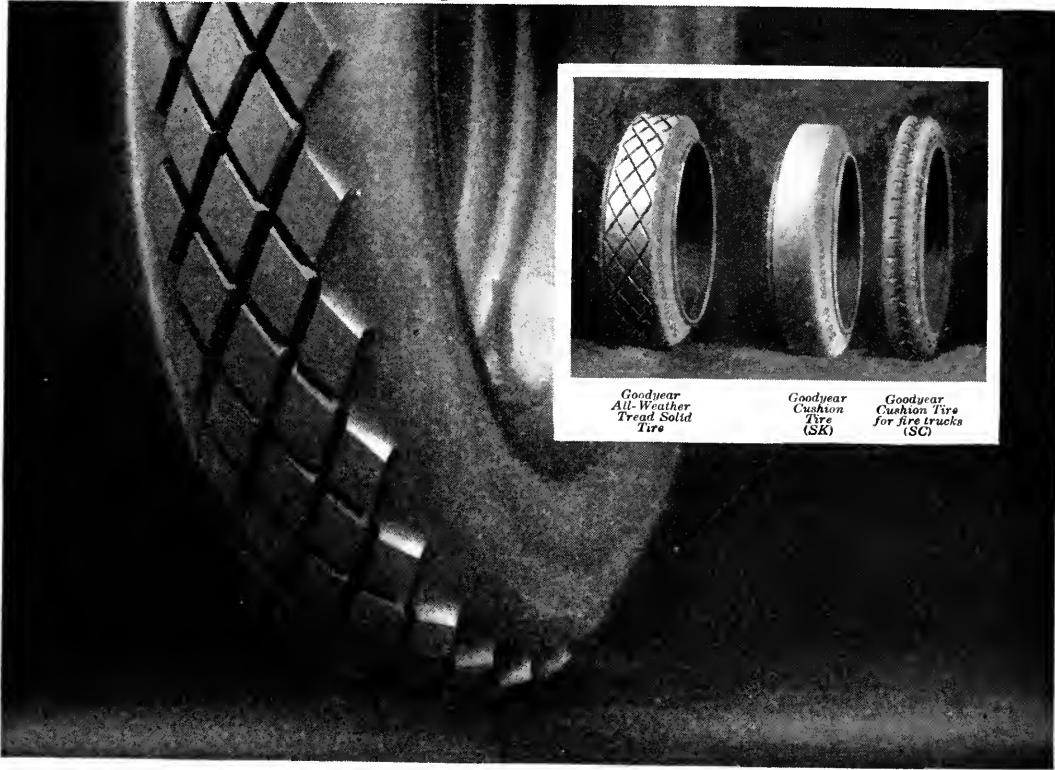
How Gardner Met the Unemployment Problem

GARDNER, MASS.—When President Harding's national unemployment conference reported its conclusions, a major recommendation was that each community endeavor to solve its problems by a study and application of relief to its own peculiar conditions—but, excellent as the suggestion may be, Gardner will not adopt it. For the "Chair Town of the World" had the jump on that efficient body of men by a good six months; it solved its own little problem of unemployment before last winter's snows had melted away. While an inspection of municipal reports will show that it cost the taxpayers a third of a million to do it, there isn't a soul in the town but is satisfied that it has been "good business."

Gardner has a population of about 17,000 and its valuation is approximately \$17,000,000, so it isn't the biggest corporation in existence. Spending \$300,000 for municipal improvements just to give men work may not appeal to the metropolitan reader as out of the ordinary, but it's pretty big doings for a town a few thousands inside the city class. During the past year Gardner appropriated close to \$900,000 for development and maintenance, with two-thirds absolutely necessary. The other third is what was spent so that the men who couldn't get jobs in the chair shops or in other industries or trades could get a week's pay and support

THE AMERICAN CITY

GOODYEAR



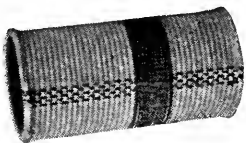
Goodyear Cord Truck Tire

Copyright 1921, by The Goodyear Tire & Rubber Co.

Goodyear Cord Tires add to the ability of the trucks equipped with them. They help to reduce hauling costs and they help to increase the work accomplished. The remarkable resilience of the tire protects the truck and its load against damage; it enables a constant, uniform speed to be maintained even over rougher roads. The sharp-edged, diamond blocks of the All-Weather Tread provide dependable

traction in snow or sleet or over soft roads. Their powerful construction enables Goodyear Cord Truck Tires to roll up mileages equaling and frequently exceeding those of solid tires.

For every class of hauling work there is a Goodyear Truck Tire that serves best and most economically: Goodyear Cord Tires, Goodyear Cushion Tires, or Goodyear Solid Tires with plain or All-Weather Tread.



*Single Jacket
Underwriters Fire Hose*

The Underwriters label on Goodyear Single Jacket Fire Hose and Goodyear Monterey Chemical Hose, means that the latter will resist satisfactorily the biting, corrosive action of chemicals and that both will stand a definite pressure per square inch. Goodyear's manufacturing experience guarantees the production of hose on a par with all other Goodyear products—hose that returns the utmost in dependable and economical service.



Monterey Chemical Hose

themselves and their families without the dread necessity of calling upon charity. It was a "big family stunt," and with conditions coming back to normal, and steady work slowly but surely approaching, it's a story worth the telling.

The Board of Directors of the Gardner Chamber of Commerce started the ball rolling. At their meeting on February 7 they discussed the unemployment situation and its effect upon the citizens of Gardner. They received reports that the overseers of the poor were supporting over 100 families, and that requests for help were daily being received from additional families. To many it promised to be a distressful summer.

From the discussion crystallized the sentiment that such public improvements as were contemplated should be started at the earliest possible moment in order that the distress might be relieved. It was felt that such improvements should be done largely by unskilled labor in order that as many citizens of Gardner as possible might be given employment. The Board recommended the immediate clearing and grading of the lot and construction of the foundation for the proposed new town hall building, which when completed will represent an outlay of more than \$350,000. The directors further recommended an appropriation for immediate construction of the proposed new Main Street, and the letting of the contract for the street on the condition that preferential employment be given to citizens of the town.

Their recommendations found ready supporters at the annual town meeting in March. At that time and at special meetings in June and August appropriations for various improvements were made which totalled \$325,400. The projects furnished work for about 500 citizens who otherwise would have had to fall back upon the town to keep themselves and their families going. The improvements included the new West Broadway playground in South Gardner, the new Wildwood Cemetery off West Street, and the dam at the new cemetery, a mile and a half of permanent concrete road



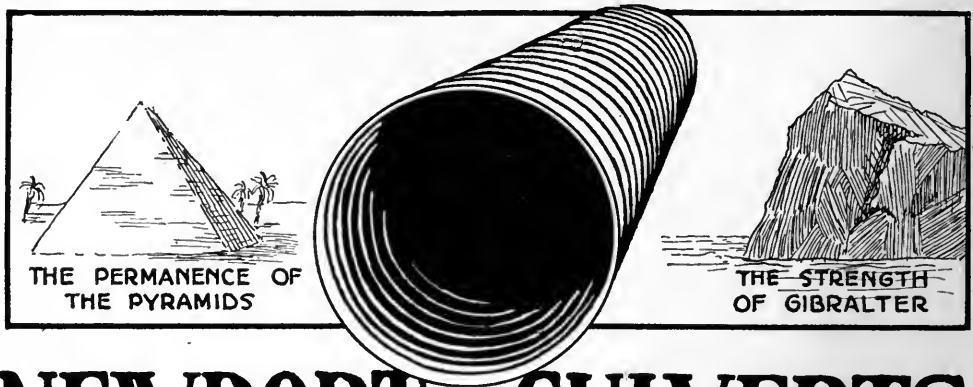
A SECTION OF THE NEW CONCRETE HIGHWAY IN GARDNER, MASS., COSTING OVER \$150,000

construction stretching from West Gardner Square to East Broadway in South Gardner, the town hall site, the Prospect Street School in South Gardner, and the new Wilder baseball park off Waterford Street, a few minutes' walk from the business section.

The new road which winds through the three sections comprising the town is declared by autoists to be one of the finest in the state and is the first step in a permanent road development planned by the town. Its cost was \$151,000 and it gave 70 local residents work. Fifty men were given work at the Wilder ball park, which derives its name from Solon Wilder, who, by the gift of a large tract of land, made the ball field possible. The grounds have been laid out and seeded and will be ready for the town baseball team in the spring. Six thousand dollars was expended on this development. The new cemetery, which is one of the prettiest spots in the town, gave employment to 150 men, and work on the near-by dam required the services of 50 others. At the town hall site 100 men were put at work razing buildings, grading and digging, and the full force was kept busy until a short time ago, when the gang was cut to 50.

Other communities the size of Gardner may have done as much, but surely not one has done more for the fellow "out of luck." In helping its unfortunate citizens over the rough places the town has helped itself. Now with the clouds lifting, the taxpayers will go slowly in the matter of improvements, for they feel they have attempted all they can afford for the present.

HARRY L. GUSTAFSON,
Manager, Gardner Chamber of Commerce.



NEWPORT CULVERTS

EMBODY BOTH PERMANENCE AND STRENGTH

The permanence of a culvert depends upon its ability to withstand corrosion and the load which must necessarily pass over the road. Newport Culverts are made of genuine open-hearth iron (99.875 per cent pure iron-copper alloy) which lasts a lifetime.

The well-known strength of corrugated metal insures the purchaser of Newport Culverts that he is getting the maximum strength for supporting the overburden and traffic load.

Newport Culverts are made in full-round and half-round shapes to make them fit all conditions. Full-round shapes are most serviceable where there is a deep fill and plenty of head room. In those places where there is little fill, the half-round culvert with flat bottom makes the best proposition because of its small height.

Full descriptive illustrated literature sent free on request.

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542 West 10th St. Newport, Kentucky

The American Legion Serves the Community

BEFORE the war there was no non-sectarian, non-political organization of young men in this country. There was no organization with an avowed purpose "to inculcate a sense of individual responsibility to the community, state and nation." Community service was a vague, theoretical something.

To-day, the American Legion is admittedly a leader in community service and community progress. It is only necessary to read the newspapers to learn of the American Legion's work in the community. Or, run through the weekly reports coming to the Post Activities Section of the organization. A glance through these reports will show the Moberly, Mo., post backing a

there are hundreds of thousands of ex-service men out of work, the problems of the welfare committee are numerous. Assistance of this committee is given needy ex-service men whether they are members of the Legion or not.

"The plight of these poor fellows is pathetic," says Leo Kelly, in charge of the employment bureau of the Legion at Minneapolis. "They are not lazy, they want to work. That is shown by a report of the tasks performed by the jobless men in a single week."

Of the several hundred community centers and post club houses erected or established since the war, many of them have been financed entirely by the Legion men.

The Sturgis, S. Dak., post voted \$11,000 of its state bonus money towards the erection of a building. Legionnaires of Ottumwa, Ia., raised sufficient money in a single day for the purchase of a community building.

There have been instances in which the Legion men have undertaken the task of cleaning



good-roads campaign; Kalamazoo, Mich., Legionnaires raising \$150,000 for a community memorial building; the Dublin, Ga., post helping the town's children establish a playground. It will show ten American Legion posts in Oklahoma establishing community libraries. These instances are typical of the work that is carried on by some eleven thousand posts of the American Legion, with a combined membership approaching a million.

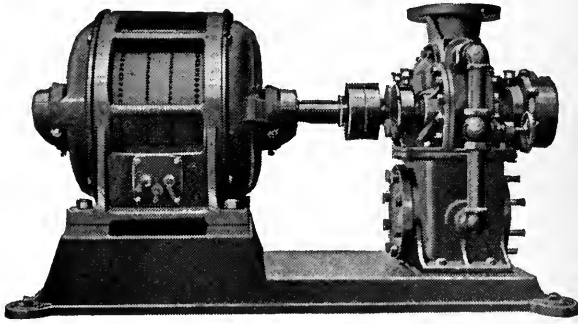
There is scarcely a town of any size without an American Legion welfare committee or employment bureau. At this time, when

their cities. This was done at Fayette, Mo., where the former fighters armed themselves with brooms and brushes and cleaned the street. At Chinook, Mont., the Legion men graveled the main street of the town. Similar stories can be told of many towns.



THE SAYLESVILLE, R. I., POST MAKES THE PLAYGROUND A REALITY AND THE LOCAL CHILDREN PREPARE FOR THEIR OWN "WORLD'S SERIES"

Northern Rotary Pump



Economy In Waterworks And Efficiency In Fire Apparatus

*“More Gallons
per
Horsepower”*

—are both undisputed records of the Northern Rotary Pump in cities where it has been in service for years.

It has the least water slippage and mechanical friction among pumps. It moves the most gallons per minute per unit of horsepower. It is rated by unbiased engineers outside of our organization as the most efficient pump manufactured.

Write To Us

—for full catalog description,—letters from users,—and specifications for a unit or apparatus that will best fit your needs.

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Street Flushing in Canadian Cities

Cost Data and Experiences of Northern American Cities with Motor Street Flushers

THE good roads propaganda which has been carried on with such thoroughness in the United States in the past few years, has spread into Canada, so that not only the Government, but various municipalities, are spending large sums of money in street improvements. Woodstock, Ontario, a typical city, has spent \$240,000 during the past year on asphalt and bitulithic pavement. The following cities have installed in the last four years one or more

"South Bend" model motor flushers and sprinklers to clean their modern business and residential streets: Three Rivers, Hull, and Westmount, Quebec; Ottawa, Welland, Lindsay, Niagara Falls, Stratford, Kitchener, London, Chatham, and Windsor, On-



A 1,000-GALLON FLUSHER MOUNTED ON FEDERAL TRUCK, OWNED BY THE CITY OF LONDON, ONTARIO

tario; Moncton, N. B., North Sydney, N. S., and Winnipeg, Man.

The following data are a composite of reports from the city engineers of the cities mentioned above, and cover the cost of maintaining and operating a 1,200-gallon



A COMPLETE MOTOR FLUSHER UNIT USED BY CHATHAM, ONTARIO, CANADA



Fort Fisher Highway, New Hanover Co., N. C. Treated with "Tarvia-B" 1915-17-18-19-21 and "Tarvia-A" in 1916.



Wrightsville Turnpike, New Hanover Co., N. C. Treated with "Tarvia-A" 1915, and with "Tarvia-B" 1917 and 1921.

Tarvia
For Road Construction
Repair and Maintenance

"The Best Investment The Board Ever Made"

Mr. Addison Hewlett, Chairman of the Board of Commissioners of New Hanover County, N. C., writes, under date of July 25, 1921:

"We have been using Tarvia for surface treating the macadam roads of New Hanover County for the past six years, and we find this treatment satisfactory in every respect.

"Before we started the use of Tarvia we had great difficulty in maintaining our roads, as they became very dusty in dry weather and washed away in wet weather, leaving our road surface full of holes and ruts. Since using Tarvia the surface of the road has been well protected in all kinds of weather, and today our roads have smooth, hard surfaces and our maintenance problem has been very easily solved. The Tarvia treatment is very inexpensive.

"It is unquestionably the best investment the Board of Commissioners has ever made and the Commissioners would

not consider for a moment discontinuing Tarvia on our roads."

Additional comments on Tarvia are made by R. A. Burnett, County Superintendent of Roads:

"Tarvia treatments are given to some of our roads every year while other roads, such as the Wrightsville Turnpike, have lasted as long as three years before requiring another treatment.

"These Tarvia treatments have cost us in the neighborhood of \$300 per mile per year and have proved to be the best, easiest and cheapest method of maintaining our roads. We have always had the best of co-operation from your engineers.

"We feel that we have a finer system of roads than any other county in the State."

No matter what your road problem may be—new construction, maintenance, or repairs—there is a grade of Tarvia made especially for the purpose. *Write for illustrated booklet describing the various uses of Tarvia.*

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THE BARRETT COMPANY, Limited

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Hallifax, N. S.

flusher on a 10-hour-a-day basis:

Oil for two motors, two quarts.....	\$.80
Gasoline for two motors, 10 gallons at 42c....	4.20
Labor, one man operating truck per day.....	5.00
Tire cost, 40 miles a day on guaranteed mileage of 8,000 miles	1.70
Interest at 6 per cent on investment of \$9,000..	1.80
Depreciation, 15 per cent per annum.....	3.69
Up-keep, repairs, etc., average \$200 per annum.	.76
	<hr/> \$17.95
Average area cleaned a day, square yards.....	216,000
Area cleaned with one gallon of water, approxi- mately, square yards.....	4
Cost of cleaning 1,000 square yards, approx..	8c

In cities having approximately 20 miles of pavement on which the flusher can be used, it was found that the business section could be cleaned twice daily and the residential streets three times a week. Where intersection dirt roads cross paved streets, it was found necessary to slow down the speed of the flusher to 4 miles per hour to scour the mud from the streets. This speed was also maintained in the business section, but in the residential parts a speed of 8 to 10 miles was found to give excellent results. It has been necessary to have a follow-up "White Wing" to clean the refuse from the gutter only once a week in the residential streets and once a day in the business district. The force of the water from the flusher carries the dirt and refuse along to the catch-basins.

In cities having less than 20 miles of paving, the power flushers have been used for several hours a day as sprinklers, the truck being run at 15 miles per hour to thoroughly wet down a 60-foot street.

The city engineers reporting have been almost unanimously of the opinion that the

flushing cleaned the streets much more thoroughly than the "White Wing" method and also resulted in doing away with the services of one-half to two-thirds of the men previously employed.

D. T. Black, City Engineer, Niagara Falls, Canada, formerly City Engineer at Welland, Ontario, reports that the Welland machine which was purchased late in 1914 reduced the cost of street sprinkling to below 2½ cents per foot frontage, which had been the minimum cost of street sprinkling in that city prior to the use of the motor sprinkler and flusher. The data from 1913 to 1918 are given below:

COST PER FRONT FOOTAGE

Sweeper and Sprinkling—	
1913.....	\$0.025
1914.....	0.025
Machine in Use—	
1915.....	0.02
1916.....	0.175
1917.....	0.0075
1918.....	0.005

In Kitchener, Ontario, the equivalent of 16 miles of pavement is flushed and 2 miles of macadam road sprinkled daily. This requires 60 gallons of gas and 2 quarts of oil a week.

In Moncton, N. B., the 1,000-gallon South Bend flusher and sprinkler, mounted on a Stewart 3½-ton chassis, was installed in June, 1921. The machine is giving very satisfactory service. It immediately did away with five "White Wings" and two teams, and, according to J. Edington, City Engineer, has given better service as regards sprinkling the dirt streets and cleaning the paved streets.

Bad Roads Are Long Roads

How They Isolate a Community

Since we have the motor vehicle we are wont to say that miles have been reduced to minutes. That bad roads make years seem longer is equally true, and frequently we come unexpectedly upon examples which testify to the truth of this fact.

Not a great while ago a party of road boosters left the mountain town of Welch, W. Va., by motor for a short run in the direction of the Hatfield-McCoy feud district. Along about noon, when the party had reached a point in Wyoming County three hours' ride from Welch, they met a lone woman riding a mule. She was induced to halt and the following monosyllabic conversation ensued:

"Do you live around here, lady?"

"Yes; over the hill yander."

"Have you been here long?"

"Bout forty years."

"Most of the time around here, I suppose?"

"Yes; we don't travel none. We did once, when we come to this country."

"Where did you move from?"

Then, as if the land from which she came by primitive conveyance was at some far corner of the world, she conveyed the information that her "folks" had come into that country from McDowell County, at a point from which the motor party had departed only three hours before—by mule a long journey; by motor 180 minutes. Roads are indeed long where slow travel restricts the mind.

—Highways News Digest.



Harley-Davidson squad of
Savannah, Ga., ready
for any call.

Savannah, Georgia, has a Modern Police Department

"The nine Harley-Davidson Motorcycles used by the Police Department here are all rendering good service. They are used daily in all weather and on all sorts of heavy roads. We have found them most dependable at all times," says W. F. Chapman, Chief of Chatham County Police Department, Savannah, Ga.

Hundreds of police departments—in the nation's largest cities and in small towns—have raised their efficiency by using motorcycles. For capturing "quick get-away" crooks, chasing speeders, regulating traffic, enforcing parking rules, for messenger service and emergency calls, you can't beat a Harley-Davidson for speed, economy and dependability. In fact, many cities have actually increased police efficiency and saved money by supplanting two or more patrolmen with one Harley-Davidson-equipped officer.

Write on your business letterhead for our free book on police use of motorcycles. And ask your dealer for demonstration and *new reduced prices*.

HARLEY-DAVIDSON MOTOR CO.
Milwaukee Wisconsin

Harley-Davidson

World's Champion Motorcycle

Municipal Finance

BONDING

ACCOUNTING

TAXATION

Is Your City Living Within Its Income?

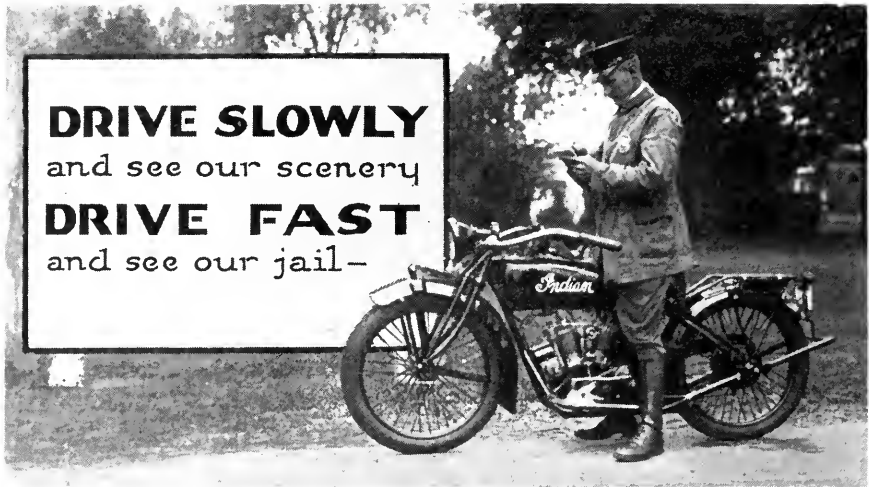
FOR eighteen years the Bureau of the Census has been annually collecting financial statistics of cities having a population of over 30,000. In the past, agents have been sent into the field for the purpose of collecting these statistics. It has now been decided that as the statistics are of greatest benefit to the cities themselves, the cities should cooperate to the extent of performing the work which has heretofore been done by agents of the Bureau in the field—that is, prepare the schedules and forward them to the Bureau, where they will be edited, prepared for tabulation, and published. The present plan for securing statistics is meeting with response, and reports are coming in. For this year the agents of the Bureau are in the field to advise with city officials and instruct them in the preparation of the schedules.

Financial statistics of cities were not collected for the year 1920, for the reason that the field agents of the Bureau were en-

gaged on work in connection with the Fourteenth Decennial Census. Statistics are now being compiled for the year ending June 30, 1921, and the following tables contain the figures of those cities whose reports have been made public. It will be remembered that while the Federal fiscal year ends with June 30, there is no such single date prevailing among cities. To keep the table within limits, no dates have been included, but in a general way the figures cover the year prior to June 30, 1921.

It is believed that the following tables offer material for very serious consideration. Although including but about a third of the cities over 30,000, they are representative of conditions. In analysing the figures, the greatest caution should be used in coming to conclusions, as, of course, such a table can give no hint of the special conditions obtaining in any given city, which might have a strong, though temporary, effect on its budget.

City	Per Capita				Per Capita Debt Minus			Form of Government
	Cost	Receipts	Surplus	Deficit	Sinking Fund	Assets	1914	
CALIFORNIA								
Long Beach.....	\$64.00	\$52.32	....	\$11.68	\$ 63.32	....	....	Commission
San Diego.....	56.05	51.23	....	4.82	163.95	\$157.93	\$199.54	Council-Mgr.
COLORADO								
Colorado Springs.....	32.52	36.94	\$4.42	....	60.36	67.10	75.46	Commission
Denver	43.87	43.03	....	.84	54.99	1.66	3.91	Council
Pueblo	32.74	37.30	4.56	....	52.25	54.73	64.46	Commission
ILLINOIS								
Aurora	24.78	25.28	.50	....	16.28	21.34	19.13	Council
Joliet	34.76	30.41	....	4.35	13.36	9.06	9.96	Commission
Peoria	26.21	28.17	1.96	....	10.27	14.14	13.72	Council
Rockford	40.51	30.92	....	9.60	20.72	10.89	9.90	Council
Springfield	35.62	36.41	.81	....	16.56	24.76	18.65	Commission
INDIANA								
Anderson	40.47	37.41	....	3.06	16.43	....	....	Council
East Chicago.....	38.76	29.78	....	8.98	19.06	10.22	....	Council
Fort Wayne.....	36.63	31.29	....	5.34	15.99	15.05	13.55	Council
Kokomo	23.70	18.51	....	5.19	11.73	....	....	Council
Muncie	17.74	16.59	....	1.16	9.90	....	....	Council
South Bend.....	39.95	37.06	....	2.89	26.51	16.85	18.43	Council
IOWA								
Sioux City.....	56.23	42.82	....	13.41	31.35	22.72	28.20	Commission
Waterloo	52.30	31.61	....	20.69	60.74	45.52	44.20	Council
KENTUCKY								
Covington	19.10	22.74	3.63	....	49.14	46.30	41.45	Commission
Lexington	22.55	26.71	4.15	....	24.47	30.40	24.19	Commission
Louisville	27.78	29.71	1.93	....	46.30	52.44	51.53	Council



That's the sign of
a town having

Indian Scouts

to guard her ways

Design particularly meets public service needs—75 to 100 pounds lighter than the average motorcycle—60 to 70 miles to the gallon—all upkeep correspondingly low.



Write for literature covering the 1922 models.
Numerous improvements.
Two brand new models.
Substantial price reductions.
Address Municipal Dept.

Hendee Manufacturing Company
Largest Motorcycle Manufacturer in the World
Springfield, Massachusetts

City	Per Capita				Per Capita Debt Minus			Form of Government
	Cost	Receipts	Surplus	Deficit	Sinking Fund 1920	Assets 1917	1914	
LOUISIANA								
New Orleans.....	34.69	35.27	.58	....	109.52	117.98	119.03	Commission
MASSACHUSETTS								
Brockton	44.71	34.84	....	9.87	55.08	54.48	50.08	Town Govt. Council
Brookline	64.09	65.61	1.52	....	24.70	40.12	....
Chelsea	37.93	32.60	....	5.33	44.72	48.01	48.75	
Fall River.....	45.04	42.29	....	2.75	49.78	45.55	42.14	
Everett	36.31	29.21	....	7.10	26.68	25.70	35.88	Council
Lynn	38.65	35.64	....	3.01	40.45	43.27	46.25	Council
Medford	39.16	36.33	....	2.82	38.31	....	....	Council
Pittsfield	37.02	38.05	1.04	....	61.64	65.47	78.54	Council
Somerville	29.16	31.37	2.22	....	12.22	19.75	19.21	Council
Taunton	46.76	43.40	....	3.36	52.44	43.36	41.30	Council
MINNESOTA								
Minneapolis	49.97	45.10	....	4.87	74.50	56.18	56.62	Council
St. Paul	45.30	37.37	....	7.93	40.13	45.32	47.27	Commission
MISSOURI								
Springfield	22.06	21.48	....	.57	7.33	4.43	7.98	
NEBRASKA								
Lincoln	44.32	40.76	....	3.56	41.02	25.18	28.49	Commission
Omaha	73.95	45.21	....	28.74	122.04	99.57	92.29	Council
NEW JERSEY								
Atlantic City.....	69.13	65.53	....	3.59	151.16	150.32	142.86	Commission
Jersey City.....	53.38	38.70	....	16.68	70.47	88.12	69.55	
NEW YORK								
Newburgh	22.72	27.52	4.80	....	18.52	....	....	Commission
New Rochelle.....	69.41	63.53	....	5.88	95.24	94.53	96.57	Council
Niagara Falls.....	48.51	45.47	....	3.04	98.83	78.27	75.36	Council- City Mgr.
Poughkeepsie	32.49	32.98	.49	....	60.40	66.29	....	Council
Rochester	47.44	39.19	....	8.25	55.68	52.72	46.61	Council
Syracuse	45.29	36.46	....	8.83	68.68	63.62	59.06	Council
Utica	29.06	30.87	1.81	....	29.93	31.12	25.71	Council
Yonkers	67.72	53.36	....	14.36	96.14	94.38	97.38	Council
NORTH CAROLINA								
Charlotte	25.12	19.25	....	5.87	57.93	51.44	56.07	
OHIO								
Lakewood	44.51	33.39	....	11.12	106.29	....	....	Council
PENNSYLVANIA								
Allentown	21.69	22.74	1.05	....	25.11	22.25	13.24	Commission
Bethlehem	55.53	24.34	....	31.19	74.06	....	....	Commission
Hazleton	21.96	15.59	....	6.37	31.50	....	....	Commission
Philadelphia	47.51	45.27	....	2.23	81.16	77.68	61.07	Council
Reading	18.78	18.41	....	.37	22.69	20.41	21.19	Commission
RHODE ISLAND								
Newport	46.26	37.79	....	8.47	38.32	30.22	....	Council
Pawtucket	37.71	38.82	1.11	....	82.05	91.61	88.55	Council
Providence	37.63	37.81	.19	....	57.27	63.79	59.22	Council
Woonsocket	38.70	28.39	....	10.31	79.64	66.93	65.75	Council
SOUTH CAROLINA								
Charleston	39.61	36.10	....	3.51	87.62	83.26	65.53	Commission
Columbia	29.31	28.28	....	1.02	51.22	56.33	38.71	
TENNESSEE								
Chattanooga	33.28	24.73	....	8.55	88.63	69.31	62.02	Commission
Knoxville	37.91	25.39	....	12.52	74.67	79.13	68.96	Commission
Nashville	29.08	26.36	....	2.72	74.63	63.12	53.10	Commission
TEXAS								
Austin	31.92	33.70	1.78	....	78.21	83.08	69.56	Commission
El Paso.....	35.58	16.36	....	19.22	59.26	54.17	54.16	Commission
UTAH								
Salt Lake City.....	56.23	42.82	....	13.41	86.45	61.97	60.09	Commission
VIRGINIA								
Lynchburg	33.27	36.43	3.16	....	79.83	81.57	85.49	Comm.-Mgr.
Roanoke	24.19	21.80	....	2.39	44.00	42.04	42.65	Comm.-Mgr.
WASHINGTON								
Spokane	35.20	43.04	7.84	....	70.48	79.06	74.36	Commission
Tacoma	46.91	55.87	8.96	....	82.28	98.89	111.06	Commission
WISCONSIN								
Oshkosh	32.26	29.38	....	2.88	45.84	41.78	36.28	Commission

EDITORIAL NOTE.—In publishing "The Houston Plan of Valuation and Taxation," by H. A. Halverton, Tax and Land Commissioner of Houston, Tex., in the September and October issues of THE AMERICAN CITY, acknowledgment should have been made to the League of Texas Municipalities, before whose annual convention the paper was originally delivered.

Which Way?



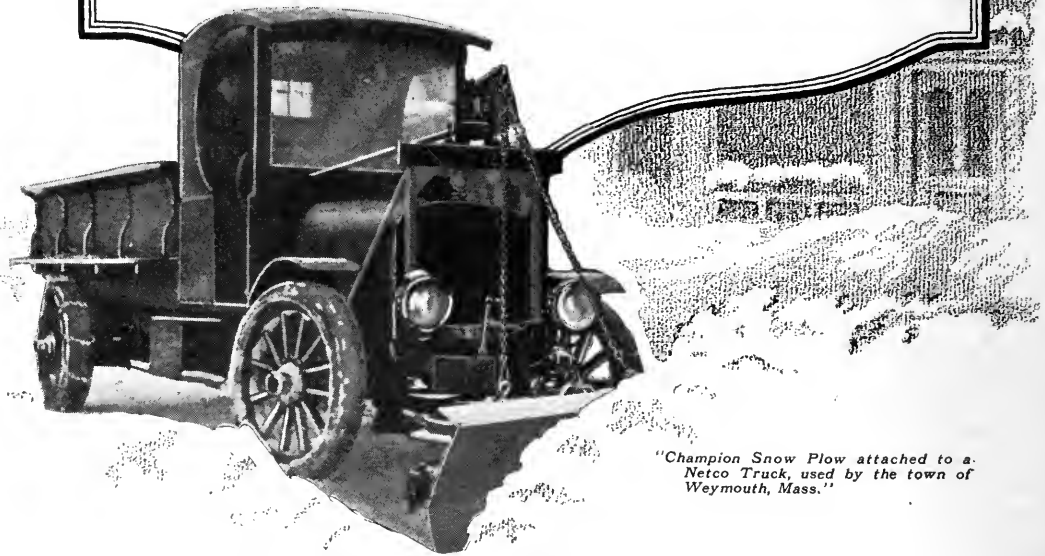
Pick and shovel cannot cope with tons of snow. Only efficient machinery can solve this problem.

WHEN the snows of winter fill the streets and highways, how do you plan to open them so that mail, express, produce and supplies may be properly handled and traffic may not be held up for days at a time?

In February, 1920, New York City was held in the paralyzing grip of a snow blockade for 12 days. The actual money loss to the city due to the interruption of traffic was Sixty Million Dollars. It took twelve days at a cost of five and one-half million dollars to partially clear the streets by the method shown above. In February, 1921, the streets were cleared in 12 hours at a very small cost by the method shown below. Which is the better way?

Without any obligation whatever, we will be glad to send you, on request, our new catalogue of the Champion Snow Plow. It will interest you.

THE GOOD ROADS MACHINERY COMPANY, INC.,
Kennett Square, Pa.



"Champion Snow Plow attached to a Netco Truck, used by the town of Weymouth, Mass."

Municipal Bond News

THE recent issue of \$11,200,000 Pennsylvania 4¾'s fifteen-thirty-year bonds has been sold to a banking syndicate at 104.31. This marks a new high for the year. These are offered to investors to yield 4.20 per cent. The bonds of the same state offered last July were on a 4.90 basis. Such figures are regarded as highly significant of the trend of municipal securities.

The United States Mortgage and Trust Company has recently been appointed fiscal agent for the payment of principal and interest of bond issues aggregating \$2,417,000, including: Winston-Salem, N. C., \$1,370,000; Bergen County, N. J., \$669,000; Pensacola, Fla., \$125,000; and Greenwich, Conn., \$104,000. These issues and others aggregating \$9,339,000, including issues of Jersey City, N. J., West New York, N. J., Wilmington, Del., and Bloomfield, N. J., are being prepared and certified as to genuineness by the same company.

A. B. Leach and Company, Inc., of New York, is offering \$300,000 road notes of Chowan County, N. C. These funds will be used for the building of hard-surfaced roads through the county.

Bond Issues Voted

BUFFALO, N. Y.—This city voted on November 8 to build a water filtration plant, at an estimated cost between \$4,000,000 and \$4,500,000. The proposed plant will be of the rapid sand type, with a capacity of 160 million gallons daily. Buffalo is also offering \$6,000,000 school bonds, \$1,300,000 hospital bonds and \$60,000 sewage pumping station bonds.

Tulsa, Okla.—On November 29, \$6,800,000 bonds were voted to provide a permanent water source for the city.

Inverness, Fla.—This town has voted a bond issue of \$75,000 for water-works and sewers, the work to commence early next spring.

Stockton, Calif.—\$135,000 has been voted for storm sewers, and a like amount for sanitary sewers.

Heavener, Okla.—\$40,000 bonds have been voted to improve and enlarge the lighting plant.

Yankton, S. D.—The \$70,000 water-works bonds recently authorized will be used in obtaining water from the Missouri River, if the tests show acceptable water in underlying sands.

Clay Center, Kans.—\$70,000 bonds have been voted for improving the electric light and water-works plant.

Ceres, Calif.—Bids will be opened January 17 for \$30,000 sewer improvement bonds.

Marlin, Tex.—\$225,000 water-works improvement bonds will soon be issued.

Bellevue, Nebr.—The village has voted \$5,000 improvement extension bonds, and \$10,000 for the purchase of water from Omaha.

Decatur, Tex.—\$100,000 water-works extension bonds and \$75,000 sewer bonds have been voted.

Manatee, Fla.—\$6,000 bonds have been voted to extend the water and sewer systems.

La Grange, Ga.—\$200,000 paving bonds and \$15,000 park bonds have been voted on and carried.

Utica, N. Y.—\$180,000 bonds have been issued for paving. It is anticipated that this work will materially relieve existing unemployment.

Atlanta, Ga.—\$8,000,000 bonds for water, sewers, bridges, schools, and paving are awaiting validation.

Braggs, Okla.—\$10,000 bonds for water-works have been carried.

Barnum, Iowa.—The Johnson Township offers \$100,000 consolidated school bonds, tax at 6 per cent.

Perry, Ga.—The city has voted \$15,000 water and light extension bonds.

Greensboro, N. C.—This city has authorized \$200,000 paving bonds, \$300,000 water-works bonds, and \$75,000 sewer bonds.

Sabetha, Kans.—\$60,000 bonds have been voted to improve the city's water-supply.

Bellaire, Ohio.—\$80,000 bonds have been voted for street improvements.



Keep Your Streets Open This Winter

AT the first heavy snowfall, Cletrac is right on the job working long hours to prevent costly tie-ups. Built like a war tank, it breaks and clears up big drifts, and keeps streets and sidewalks open. Cletrac's short turning radius and easy steering qualities enable it to work with ease in tight places, to keep curbs and sewers clear, and to come to the rescue of stalled traffic.

Your city will save money and help insure the comfort of its people this winter by ordering one or two Cletracs, or a fleet of them (depending upon size of town), *now*. For Cletrac has proved by *performance* in New York, Minneapolis and elsewhere,

that it is *the snow fighter that never quits*—the tractor that not only keeps roads open and traffic moving in winter, but also handles most of the street repair and road maintenance jobs in summer.

May we tell you more?

THE CLEVELAND TRACTOR CO.

Largest Producers of Tank-Type Tractors in the World

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Cleveland, Ohio



HARD THIS
WAY, BUT—



EASY ON A TRACK
THE CLETRAC WAY

The City's Legal Rights and Duties

Information for City Attorneys and Other Municipal Officers, Summarizing
Important Court Decisions and Legislation

Conducted by A. L. H. Street, Attorney at Law

Right to Public School Property Included in Territory Annexed by City Held to Pass to City Without Payment of Compensation

The Council of the city of Jeffersonville, Ind., passed an ordinance annexing certain territory of an adjacent township. Included in this territory were three public school buildings. Suit was brought to annul the annexation proceedings for want of steps taken to compensate the township for loss of the buildings. But the Indiana Appellate Court indicates in the case of *City of Jeffersonville vs. Jeffersonville School Township*, 130 *Northeastern Reporter*, 879, that the township is without right to complain:

"A school township has no vested interest in public school property. Such township holds the property merely as trustee for the public, subject to change at any time by legislative act . . .; and in the absence of a statute to the contrary, the title to public school property included in territory annexed to a municipal corporation passes to the annexing corporation without payment of compensation to the corporation from which it is taken."

It is found by the Court that the statute under which the township claimed right to an appraisal of the property had been repealed.

Test of Power of City Councils to Vacate Streets and Alleys

The Legislature has given to the councils of cities power to lay out, establish, open, alter, widen, extend, and vacate streets and alleys. Such city councils exercise the powers aforesaid, and have the control of all public streets and alleys for the use and benefit of the public. The authority to exercise any one of the above-given powers is not an arbitrary or absolute authority, but is one to be exercised in the interest of the public. They cannot lay out a street for any other than the public uses of the street. They cannot give away by donation or va-

cate for private use a street or alley belonging to the public. If the sole purpose and effect of the vacation of a street or alley are to give away the public right or to dispose of it solely for private rights or benefits, it is the duty of the courts, if their authority is properly invoked, to declare the act beyond the power delegated, unless the conditions are such as to amount to an equitable estoppel. The power of the municipality to make such alteration or vacation is not to be determined or affected merely by the fact, if such appears, that some individual is asking for such alteration or vacation and will be much benefited thereby, while other private persons may, on the other hand, suffer some loss to their business or property. Such matters merely go to the motive by which the act of vacation is performed, and the motive by which the legislative body is actuated is immaterial and cannot be inquired into. (*Illinois Supreme Court, People vs. Atkins*, 128 *Northeastern Reporter*, 913.)

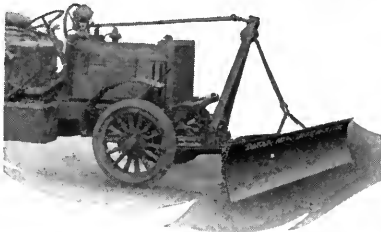
Where Specifications Are Silent as to Time of Performance of Contract, Reasonable Time Will be Implied and Fixed by Terms of Contract

Proceedings for the construction of a public improvement are not vitiated by the circumstance that the ordinance authorizing the improvement and the notice to bidders may not specify a time for completion of the work. Omission of such specification leaves an implication that the work is to be done within a reasonable time, and when the contract is awarded, a time limit constituting a reasonable time may be fixed in the agreement. In addition to so deciding in the case of *City of Webster Groves v. Reber*, 226 *Southwestern Reporter*, 77, the *St. Louis Court of Appeals* holds that the municipal authorities may validly make reasonable extensions of the time for completing contract work.

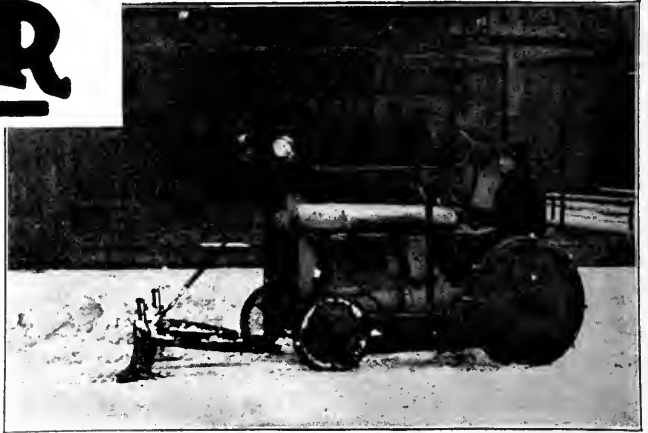
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Special Snow Plow for Fordson Tractor

In Baker Snow Plows you get the highest type of snow plow made. Patent, hinged, spring-supported blades prevent injury to the plow. Used only on Baker Snow Plows. Simple, sturdy, practical construction—the result of our long experience in making snow plows. We can help you move snow. Make your motor trucks and tractors useful all year 'round.

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Horse Drawn Tractor Driven



Will mount curbs with ease and remove 24 inches of snow in one trip. The wings are adjustable to any width and either wing may be detached. One user writes regarding use with tractors, "The plow is so simple and the method of attaching so easy that these facts coupled with the reasonable price should make a strong appeal to all tractor owners interested in snow removal."

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PHOENIX Highway Snow Plow

Clear the heaviest snowfall with horse, truck or tractor power. The Phoenix Plow is built of selected hardwoods, re-inforced with heavy forgings and castings. Adjustable wings for wide streets or narrow roads. **Sales Agents wanted!** Write us today for complete information. Address Dept. F-12.

PHOENIX MFG. CO., Eau Claire, Wis.

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A dependable mount for park patrolling. Light-weight, very economical, as easy to ride as a bicycle. 75 miles to the gallon of gasoline. Price \$185.

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Cleveland, U. S. A.

A Judicial Essay on the Prerogative of Municipal Authorities to Determine the Necessity for Sewer Improvements

Chief Justice Walker of the Missouri Supreme Court, speaking for that tribunal in the recent case of *McMurray vs. Kansas City*, 223 *Southwestern Reporter*, 615, said concerning limitations on the power of municipalities to order sewer improvements at the expense of property benefited:

"The only limitations upon the right of a city in the exercise of its charter powers to establish sewer districts and provide for the construction of sewers therein, is that acts or ordinances in furtherance of such power shall not be the creatures of fraud, whim, or caprice, or in violation of common rights, or impose a burden on the citizen of the community without any corresponding benefit. Absent these limitations, and the courts with uniformity recognize the public necessity of sewer systems for municipalities, and are loath to interfere with the exercise of their power in that behalf. Even the superficial student of civic conditions knows that the freedom of modern cities from plagues which in other centuries decimated centers of population is due more to the present system of sewers than to any other single cause. Moreover, health is a primary postulate to right living, and the maxim of *mens sana in corpore sano* is not a mere phrase, but is worthy to be ranked as a proverb. The wisdom of the Talmud is but further attested by the trite but terse truth that cleanliness is next to godliness; and was it not my Lord Verulam who sententiously said that "cleanness of body was ever deemed to proceed from a due reverence to God"? It is evident, therefore, that the end to be attained in an improvement of the character here under review, whether or not it be presently recognized, is not limited to the promotion and preservation of the health of the people of a city, but has a wider and a deeper effect in elevating their moral tone, and thereby encouraging right living.

"The courts, conscious of these facts, of which they cannot but take judicial notice, have, as is evident from their rulings, striven, without unduly straining municipal power, to sustain and encourage plans for the construction of sewer systems. In so doing, the end sought to be effected is classified as of like public importance with that of the building and lighting of streets, the establishment and maintenance of a means for supplying water, and the removal of garbage. The conclusion, therefore, reasonably deducible from the foregoing, is that municipalities in the exercise of their powers in such matters of public importance as we have indicated are, in addition to the mere power to act, vested with a discretion not subject to review by the courts, unless it is affirmatively shown to have been exercised arbitrarily, fraudulently, or oppressively."

City Entitled to Voice in Judicial Proceedings to Vacate Streets—Private Benefit Will Not Justify Vacation

In the case of *Story & Clark Piano Company vs. Ottawa Circuit Judge*, 179 *Northwestern Reporter*, 254, the Michigan Supreme Court declines to disturb defendant judge's action in denying a petition for vacation of the portion of a street adjacent to the piano company's property in Grand Haven, Mich.

One question raised in the case was whether, under the Michigan law providing for petitions to the circuit court for vacation of streets and entitling all interested persons to appear and be heard, the city of Grand Haven was entitled to remonstrate against the proposed vacation. Answering this question in the affirmative, the Supreme Court observes:

"We are impressed that the city has a right to be heard in a proceeding instituted to vacate any of its streets. The streets are for the use of the public, and under the care and control of the municipality."

Another point adjudicated by the Supreme Court is that the fact that a street may not be much used and that its vacation will prove of great private benefit will not justify a vacation. On this phase the opinion says:

"While there is testimony tending to show that the street is but little used at present, there is other testimony tending to show a considerable present use of it, particularly during the summer months. . . . If all streets were vacated which are not used as much as the main arteries of travel, great inconvenience would result to no inconsiderable portion of the public. There is testimony in this record showing that but little has been done by the city on the street to keep it up, but there is also testimony that the policy of the law has been not to expend money on streets which are soon to be paved; there is testimony that paving of this street is in contemplation of the city authorities. It leads to the railroads, steam and electric; to the docks of the lake steamers; it is but a block from the leading street of the city upon which traffic is very congested. In fine, there is an abundance of testimony to establish both a present and a future public use, and a present and future public necessity, and a present and future convenience. It is not a street merely upon paper, but has been one of the public streets of the city for over 80 years. That its vacation would be of great private benefit to the petitioner is established. But the streets of a city may not be vacated and their use surrendered to private interests solely on the grounds of private benefit. The public interest, present and future, must be considered."



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The "Caterpillar's" usefulness is not limited to moving dirt or removing snow. For road building, working on farm or ranch, in the mining, oil and lumber industries—wherever power and endurance are at a premium, the "Caterpillar"* has no real competitor*

After exhaustive investigation the South Park Commissioners selected "Caterpillar"* Tractors for leveling Grant Park, Chicago's world-famous front yard. A third of a million cubic yards of earth will be moved in completing this 210-acre lakeside park. Besides speeding up the job and enabling them to handle big daily yardages at a notably low cost, the "Caterpillars"* are always ready to push their big Holt snow plows, keeping Michigan Avenue and other vital thoroughfares continuously open for traffic. Public officials and engineers throughout the country have proved the supremacy of the "Caterpillar"* as an all 'round power producer for civic improvements. Let us show you our motion picture of "Caterpillars"* in action.

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NEW IDEALS IN THE PLANNING OF CITIES, TOWNS AND VILLAGES

John Nolen, Town and City Planner, Cambridge, Mass. Second edition. 140 pp. Illustrated. The American City Bureau, Tribune Building, New York. Single copies, \$1.00.

The purpose of this book is to present fundamental principles and to stimulate the intelligent study of city planning as one of the problems of citizenship. Within a small compass it gives a clear, concise description of the processes of town planning and replanning. A special merit of the book is that it reckons with the limitations and difficulties of the smaller places, where at the present time leadership along this line is much needed.

MOTOR TRUCK TRANSPORTATION—THE PRINCIPLES GOVERNING ITS SUCCESS

By F. Van Z. Lane, C.E., Lecturer on Motor Truck Transportation, New York University. D. Van Nostrand Company, New York. 1921. vi + 153 pp. Illustrated. Price, \$2.00.

A brief and logical presentation of the principles that govern successful motor-truck operation, of value to the shipper, transportation man, purchaser, economist and seller. It contains pertinent chapters on motor truck operating cost factors, cost records, the motor truck versus horse-drawn vehicles, a comparison of hauling by motor truck and railroad, the value of highway transport surveys, types of bodies, methods of loading and unloading, including auxiliary devices, the maintenance of trucks, the value of trailers and semi-trailers, and the ever-present need of good roads as essential to successful motor truck operation.

PUBLIC HEALTH SURVEYS: WHAT THEY ARE—HOW TO MAKE THEM—HOW TO USE THEM

Murray P. Horwood, M.S., Ph.D., Instructor, Department of Biology and Public Health, Massachusetts Institute of Technology. John Wiley & Sons, Inc., New York. 1921. XXII + 402 pp. Charts and illustrations. Price \$4.50.

An admirably prepared volume for the health officer, board of public health, sanitary inspector or social worker who contemplates a survey in any community. For those who have had previous experience, the book will be helpful in giving a broader view of the subject and possibly a better coordination of the work, and for those who have little practical experience, this volume will be very helpful. It is a book which should be a part of every public health library as a potential force in the speedy organization of personnel for a public health survey of a community.

FIRE PREVENTION AND FIRE PROTECTION—A HANDBOOK OF THEORY AND PRACTICE

Joseph Kendall Freitag. Second Edition, John Wiley & Sons, Inc., New York. 1921. X + 1,038 pp. Diagrams, tables and illustrations. Price, \$5.00.

In order to keep pace with the most improved designs, construction and equipment of buildings from the fire prevention standpoint, Freitag's well-known handbook of fire prevention and fire protection has been revised and made even more valuable. In order to eliminate data which would be affected particularly by the Great War, tabulations do not include in most instances material since 1909. The book, however, is particularly valuable for the municipal official, the builder and the designer who desire in one volume the wealth of data necessary for the proper codification of building laws from the fire prevention standpoint, and who wish to build to reduce fire losses.

HANDLING OF INFLAMMABLE MATERIALS

"An Ordinance Regulating the Keeping, Storage, etc., of Inflammable Materials, etc., and to Regulate Dry Cleaning Establishments, Garages, Fire Exits, etc." 30 pp. 1921. This ordinance was passed in May in Hoboken, N. J., and is published by the Commercial Union Assurance Co., Ltd., as a helpful guide for all municipalities contemplating improved fire codes. (Apply to publishers, 114 Fifth Avenue, New York, N. Y.)

CITY PLANNING IN PITTSBURGH

"A Major Street Plan for Pittsburgh." Report No. 2 of the Citizens Committee on City Plan of Pittsburgh, Pa. 65 pp. Illustrated. 1921. 50 cents. An excellent presentation of the traffic problems of Pittsburgh and their solution. (Apply to Frederick Bigger, Executive Secretary, Citizens Committee, First National Bank Building, Pittsburgh, Pa.)

HOUSING PROGRESS IN CINCINNATI

"Housing Progress in Cincinnati." Second Report of the Cincinnati Better Housing League. 32 pp. Illustrated. 1921. Description of the effective work of the league in bettering conditions in Cincinnati. (Apply to Bleecker Marquette, Executive Secretary, The Cincinnati Better Housing League, 25 East Ninth Street, Cincinnati, Ohio.)

UNIFORM TRAFFIC LEGISLATION

"Proposed Uniform Vehicle Law." Adopted by the Executive Committee of the International Traffic Officers' Association, at Cleveland, Ohio, December 8, 1920. 35 pp. 1921.

PUBLIC WORKS IN HAWAII

Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii. Year ending June 30, 1921. 41 pp. (Apply to Lyman H. Bigelow, Superintendent of Public Works, Honolulu, T. H.)

TOWN PLANNING IN SOUTH AUSTRALIA

A pamphlet describing "Colonel Light Gardens." Illustrated. 1921. This is the first serious attempt at a comprehensive scheme of a town-planned suburb embodying modern principles of design and control by any Australian state under the Garden Suburb and Town Planning Acts. (Apply to W. J. Earle, Government Town Planner, Department of Town Planning, Education Building, Adelaide, South Australia.)

TESTING HIGHWAY MATERIALS

"Standard and Tentative Methods of Sampling and Testing Highway Materials," recommended by the Second Conference of State Highway Testing Engineers and Chemists. Bulletin No. 949, United States Department of Agriculture. 98 pp. Illustrated. 1921. (Apply to United States Department of Agriculture, Washington, D. C.)

EQUIPMENT OF PLAYGROUNDS

"Layout and Equipment of Playgrounds." Published by The Playground and Recreation Association of America. 60 pp. Diagrams. 1921. Discusses general considerations, the laying out of the individual playground, and common types of apparatus and their use. (Apply to publishers, 1 Madison Avenue, New York, N. Y.)

CITY PLANNING IN CLEVELAND HEIGHTS

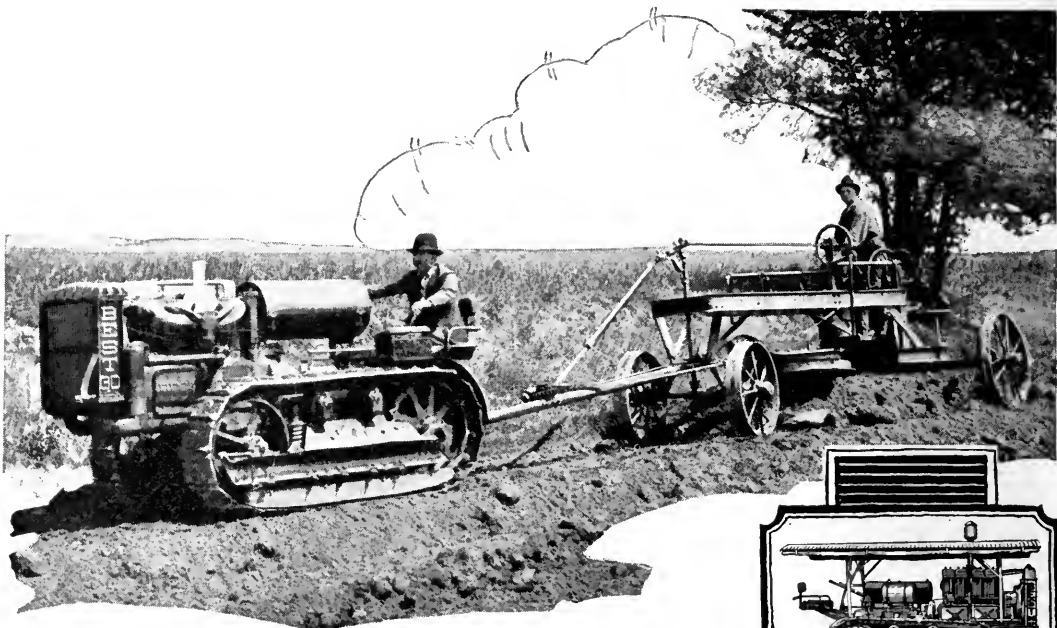
Planning and Zoning Ordinance for the City of Cleveland Heights, Ohio. Adopted August 2, 1921. 16 pp. Map. (Apply to E. C. Baxter, Chairman, City Planning and Zoning Commission, Cleveland Heights, Ohio.)

AMERICANIZATION IN DELAWARE

Bulletin of the Service Citizens of Delaware, Vol. III, No. 2. Prepared by Helen Hart, Executive Secretary, Delaware Americanization Committee. 59 pp. Illustrated. 1921. Describes the work of the Committee during the last year. (Apply to Joseph H. Odell, Director, Service Citizens of Delaware, Wilmington, Del.)

PROPERTIES OF CONCRETE

"The Thermal Conductivity and Diffusivity of Concrete," by A. P. Carman and R. A. Nelson, respectively Professor of Physics and Assistant in Physics, University of Illinois. Published as Bulletin No. 122, Engineering Experiment Station, University of Illinois. 39 pp. Illustrated. 1921. 20 cents. Also, "Studies on Cooling of Fresh Concrete in Freezing Weather," by Tokujiro Yoshida. Bulletin No. 123. 63 pp. Illustrated. 1921. 30 cents. (Apply to publishers, Urbana, Ill.)



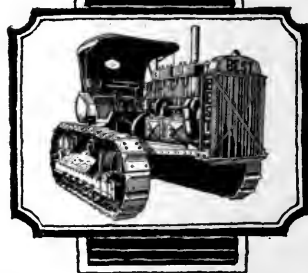
Cheaper power with tractors

Tractors are proving profitable equipment for road-builders in all parts of the country—profitable because of the time saved on a given piece of work, and because of the fewer hands required.

With a BEST TRACKLAYER TRACTOR the contractor can go ahead with his work in most any weather. He moves more earth and makes a better, smoother job. His power is steady, dependable, flexible and compact. He can negotiate grades without difficulty, and in faster time.

BEST TRACTORS have proven their mettle over a period of many years in all parts of the world. They have earned a reputation for dependability, power and low cost of operation. BEST design and workmanship have been established by time and the test of actual, practical usage on a large variety of heavy-duty work.

Write for full data, prices and the names of our nearest dealers. Let us give you the details of how Best Tractors are serving road-builders.



BEST
TRADE MARK
TRACKLAYER
REGISTERED
TRACTORS

C. L. BEST TRACTOR CO.
SAN LEANDRO, CALIFORNIA

There are three models of Best Tracklayer Tractors as shown above. All are factory built—not assembled

HANDLING TRAFFIC IN CONGESTED CENTERS

Report of the Committee on Economics of Schedules to the American Electric Railway Transportation and Traffic Association, before the annual convention of October 3-6, 1921. Published by The Beeler Organization, 52 Vanderbilt Avenue, New York, N. Y. Describes methods of handling traffic in the principal American cities, and the results obtained from such methods. (Apply to The Beeler Organization, address above.)

ROAD CONSTRUCTION

"Manual on Road Construction for Resident Engineers and Inspectors." Prepared by B. H. Piepmeier, Engineer of Construction, Division of Highways, of Illinois. Published as Bulletin No. 16, Division of Highways, Department of Public Works and Buildings, State of Illinois. 73 pp. Illustrated. 1921. A concise and practical pamphlet of information needed by road builders. (Apply to author, Springfield, Ill.)

HOUSING AND TOWN PLANNING IN MASSACHUSETTS

Annual Report of the Division of Housing and Town Planning for the year ending November 30, 1920. Published as Public Document No. 103, Commonwealth of Massachusetts. 42 pp. 1921. Includes a survey of housing and town planning developments throughout the state. (Apply to Richard K. Conant, Commissioner, Department of Public Welfare, Boston, Mass.)

WATERWAYS OF NEW YORK STATE

Eleventh Annual Report of the New York State Waterways Association, including the proceedings of the Eleventh Annual Convention. 128 pp. 1921. (Apply to George Clinton, Jr., Secretary, 1012 Prudential Building, Buffalo, N. Y.)

WATER-SUPPLY OF ILLINOIS

"Chemical and Biological Survey of the Waters of Illinois." Report for the years 1918 and 1919. Published as Bulletin No. 16, Department of Registration and Education, Division of the State Water-Supply. 280 pp. Illustrated. 1920. (Apply to William A. Noyes, Secretary, Board of Natural Resources and Conservation Advisors, Department of Registration and Education, Urbana, Ill.)

TOWN-PLANNING LAW IN MASSACHUSETTS

"Massachusetts City and Town-Planning Law," published by the Massachusetts Federation of Planning Boards as Bulletin No. 9, August, 1921. 50 pp. Contains the Massachusetts City and Town Planning Law and excerpts from the constitution and general laws of Massachusetts relating to the subject. (Apply to William Roger Greeley, Editor, 9 Park Street, Boston, Mass.)

ZONING IN WEST ORANGE, N. J.

"Tentative Report of the Commission on Building Districts and Restrictions," of West Orange, N. J. 30 pp. and map. June 1, 1921. (Apply to Alfred J. Grosso, Chairman of the Commission, West Orange, N. J.)

BEAUTIFYING SCHOOL GROUNDS

"Design and Improvement of School Grounds," by W. C. Coker and Eleanor Hoffman, both of the University of North Carolina. Published by the University as Special Series No. 1, Bureau of Extension Bulletin. 68 pp. Illustrated. 1921. 75 cents. Contains suggestions and designs for beautifying school grounds. (Apply to the University Extension Division, University of North Carolina, Chapel Hill, N. C.)

PALISADES INTERSTATE PARK

Twenty-first Annual Report of the Commissioners of the Palisades Interstate Park. Published as Legislative Document (1921) No. 85. 24 pp. (Apply to J. DuPratt White, Secretary, Palisades Interstate Park Commission, 90 Wall Street, New York, N. Y.)

COMMUNITY CENTERS

"A Jewish Community Center in Action." By Philip L. Seaman, General Director of the Chicago Hebrew Institute, being the Directors' Report for the year ending May 1, 1921. 61 pp. An account of the activities of the Institute in assisting the immigrant's adjustment to his new environment. (Apply to author, Chicago Hebrew Institute, Chicago, Ill.)

ZONING IN CLEVELAND HEIGHTS, OHIO

Report of the City Planning and Zoning Commission to the City Council of Cleveland Heights, Ohio. 4 pp. Map. 1921. (Apply to Edwin Baxter, Chairman, City Planning and Zoning Commission, Cleveland Heights, Ohio.)

FIRE-PREVENTION EDUCATION

"The Trial of Fire," published by The National Board of Fire Underwriters. A drama of fire-prevention education written especially for school presentation. 14 pp. Illustrated. (Apply to publishers, 76 William Street, New York, N. Y.)

CITY PLANNING IN DETROIT

A series of seven pamphlets published by the City Plan Commission of Detroit. 1921. "Platting Regulations," "City Tree Planting," "Detroit Suburban Planning," "A Building Zone Plan for Detroit," "A Center of Arts and Letters," "Conditions in Detroit, 1915," Preliminary Plan of Detroit." (Apply to T. Glenn Phillips, Secretary, The City Plan and Improvement Commission, Detroit, Mich.)

AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS

Proceedings of the American Society for Municipal Improvements, at the convention held in St. Louis, Mo., Oct. 12-15, 1920. 1921. 420 pp. Illustrated. (Apply to Charles Carroll Brown, Secretary, Valparaiso, Ind.)

NATIONAL CONFERENCE ON CITY PLANNING

Proceedings of the Twelfth National Conference on City Planning, held in Cincinnati, April 19-22, 1920. 165 pp. \$2.25. (Apply to Flavel Shurtleff, Secretary, 60 State Street, Boston, Mass.)

THE DISTRIBUTION OF POPULATION

"Population and Its Distribution," compiled from the figures of the 1920 United States Census, including the distribution of retail and wholesale dealers, compiled from trade sources. Published by the J. Walter Thompson Company, New York. 1921. 335 pp. Maps. \$5. (Apply to the J. Walter Thompson Company, 244 Madison Avenue, New York, N. Y.)

THE ORDINANCES OF WALTHAM, MASS.

Charter and Consolidated Ordinances, 1921, of Waltham, Mass. Includes reference to the most important general laws relating to the city. 1921. 298 pp. (Apply to Richard Steele, City Clerk, Waltham, Mass.)

ARCHITECTURAL DECORATION

"The Volute in Architecture and Architectural Decoration," by Rexford Newcomb, Assistant Professor of Architectural History, University of Illinois. Published as Bulletin No. 121, Engineering Experiment Station, University of Illinois. 85 pp. Illustrated. 1921. 45 cents. (Apply to publishers, Urbana, Ill.)

BUILDING OFFICIALS' CONFERENCE

The Proceedings of the Seventh Annual Meeting of the Building Officials' Conference, April 27-30, 1921. 75 pp. Including lists of those in attendance and of members. (Apply to Fred W. Lumis, Secretary-Treasurer of the Conference, Building Inspector, Springfield, Mass.)

THE PEOPLE'S INSTITUTE OF NEW YORK

Annual Report of The People's Institute for the year 1920-1921. 43 pp. Illustrated. Accounts of the Institute's educational and social activities. (Apply to Edward F. Sanderson, Director, The People's Institute, 70 Fifth Avenue, New York, N. Y.)

SOIL POLLUTION

"Investigation on Soil Pollution and the Relation of the Various Types of Privies to the Spread of Intestinal Infections," by I. J. Kligler, Ph.D. Published as No. 15, Monographs of the Rockefeller Institute for Medical Research. 75 pp. Diagrams. 1921. (Apply to author, The Rockefeller Institute for Medical Research, Avenue A and 66th Street, New York, N. Y.)

CITY PLANNING IN PORTLAND, ORE.

"City Plan of the West Side Plat of Portland." A preliminary study by the City Planning Bureau of the City Club of Portland. 27 pp. Map and illustrations. 1921. The pamphlet gives special attention to the street system structure and traffic facilities. (Apply to E. T. Mische, Chairman, City Planning Bureau of the City Club, Portland, Ore.)

ROCHESTER POLICE BUREAU

"Report on a Survey of the Police Bureau of Rochester, N. Y." Submitted by the Rochester Bureau of Municipal Research, Inc. 22 pp. 1921. (Apply to James W. Routh, Director, Rochester Bureau of Municipal Research, Inc., Rochester, N. Y.)

CANADIAN PARKS

"Report of the Commissioner of Dominion Parks" for the year ending March 31, 1920. 51 pp. Illustrated. 1921. (Apply to J. B. Harkin, Commissioner, Dominion Parks Branch, Department of the Interior, Ottawa, Can.)

TAXATION

"Squandered Taxes," address of Richard Henry Dana before the annual convention of the Civil Service Reform League. 12 pp. 1921. (Apply to publishers, the National Civil Service Reform League, 8 West 40th Street, New York City, N. Y.)



Speaking of the Efficiency of Motorized Equipment

—this Mack tractor was purchased by the City of Akron to haul trailers carrying garbage to the Municipal Hog Feeding Grounds.

The tractor was bought with the specific understanding that it would haul three fully loaded trailers. In actual operation, however, it has been hauling six constantly and without any difficulty.

In the nine mile route covered by the tractor and its load there are several grades, one of which is 9%.

Regular and special Mack trucks and tractors are made to meet a wide range of municipal hauling requirements. The cooperation and unbiased advice of our Public Works Department are offered to municipal, township and county officials. Address Room 47

INTERNATIONAL MOTOR COMPANY
25 Broadway, New York



Capacities—1½ to 7½ tons. Tractors to 15 tons.

“PERFORMANCE COUNTS”



Methods, Materials and Appliances

News for Boards of Public Works, Engineers, Contractors, Purchasing Agents, and Others Interested in the Economical Construction and Efficient Operation of Public Improvement Undertakings

A Frost-proof Fire Hydrant

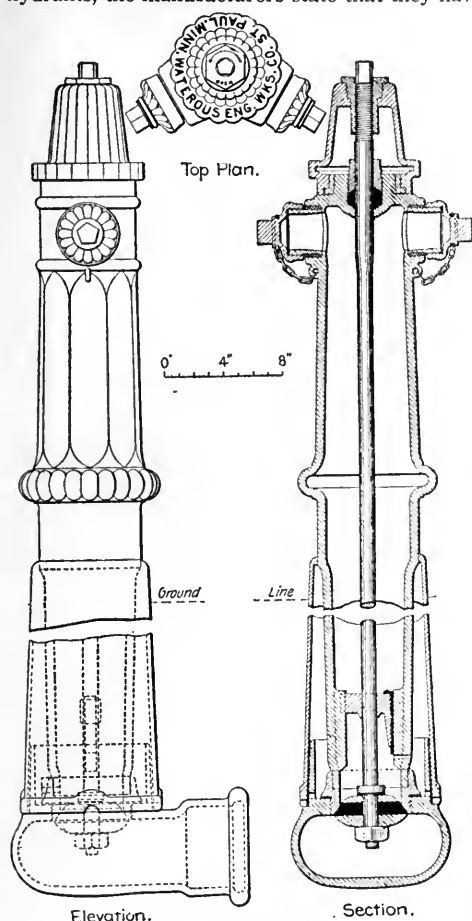
The Waterous compression fire hydrant illustrated herewith has a number of interesting features, particularly the arrangement of the stand-pipe and the frost-jacket. This frost-jacket is claimed by the manufacturer, the Waterous Fire Engine Company, St. Paul, Minn., to render the hydrant less liable to freeze, owing to the air space between the two parts, thus adapting the hydrant particularly for use in cold climates. While it is frequently the case that during protracted cold spells severe fire losses occur in towns through the freezing of some makes of hydrants, the manufacturers state that they have

never heard of a Waterous frost-proof fire hydrant's being frozen.

Another point claimed for this hydrant is its simplicity. The number of parts have been reduced to a minimum, and not a single bolt is used in its manufacture. Where two parts are connected, a thread is used in place of a bolt and nut. This has an advantage when it is desired to take the hydrant apart. Where threads are in contact, one is cut in bronze and the other in iron, and thus corrosion or sticking of the threads is prevented. The drip-valve is automatic, being so attached to the valve rod that when the main valve is opened the drip-valve is closed, and when the main valve is closed the drip-valve is open, allowing the waste water to escape from the stand-pipe. The brass valve-seat is cast with two guides on the inside, these guides extending $2\frac{1}{4}$ inches high and 1 inch wide, and the part surrounding the stand-pipe on the outside is $1\frac{1}{2}$ inches long. The stand-pipe of the hydrant is inserted in the opening between the guide and the valve-seat and is permanently attached to it.

At the base of the valve-seat and below the bottom of the stand-pipe, the drip-hole is drilled through to the interior of the water chamber. The drip-valve is attached to the cast iron guide, which in turn is cast integral with the upper washer holding the main valve in place. The drip-valve is made of harness leather and is recessed in the drip-valve guide, and is at all times in contact with the brass guide. When the main valve is opened to permit the use of the hydrant, the drip is lowered and closes the drip-hole, preventing the water from wasting or leaking out and up between the stand-pipe and the frost-jacket, and when the main valve is closed, the drip is opened to permit the water remaining in the stand-pipe to drain out. This device is simple and efficient and the stand-pipe is thoroughly drained. Because there is no accumulation of water at the base after the main valve is closed, there is no freezing in sub-zero weather, which causes so much trouble.

The main valve is made of oak-tanned sole leather, carefully fitted and turned in a lathe to insure its accurate fit with the beveled valve-seat with which the hydrant is furnished. The hydrant closes so gradually that water-hammer is avoided. As the valve opens downward against the pressure of the water, the pressure is utilized in closing and holding the valve in place. Should the hydrant be accidentally broken by, say, a runaway team or truck, the valve remains closed, thus preventing water waste or damage.



TWO VIEWS OF A MODERN HYDRANT

TIFFIN

Motor Driven

FLUSHERS and SPRINKLERS

Licensed under Ottoty Patent No. 795059



BUILT IN 600 TO 1500 GALLON CAPACITIES

In every class of service, some one product stands as a leader. This position, in motorized street flushing service, is held by Tiffin Machines.

We were the first to build practical, successful operating machines for this field. We have maintained Tiffin supremacy through valuable improvements and through the sheer merit of our honest manufacturing policies.

The Tiffin design is inherently right,—one motor to propel the

vehicle and a separate motor to supply flushing and sprinkling pressure.

In service, records prove that this TWO-MOTOR-SYSTEM design does better work as well as more work and at a lower operating cost.

We will be glad to submit the proof of these statements and an imposing list of Tiffin users. Wherever Tiffin Machines are given an impartial opportunity to demonstrate, they have invariably been selected.

THE TIFFIN WAGON COMPANY, Tiffin, Ohio

Representatives in Principal Cities

Builders, also, of Tiffin Motor Trucks in 1½ to 6 ton capacities; Tiffin Municipal Vehicles and Tiffin Dump and Farm Wagons.



A STURDY REFUSE RECEIVER FOR SIDEWALKS

A Refuse Box for Public Streets

The problem of keeping city streets clean is as much a question of preventing material from being thrown on the streets as it is of removing it from the street surface after it has accumulated. The Union Iron Products Company, East Chicago, Ind., is now manufacturing the refuse box illustrated herewith. This box measures 16 inches wide, 15 inches deep and 30 inches long, as a standard, but is also made in other dimensions to suit particular locations.

On the lid of the refuse box are stamped the words "Help Keep the City Clean," in counter-sunken letters, and on the sides can be painted or stenciled the ward number and the name of the department, or such other information as may be required by the city using the box. The

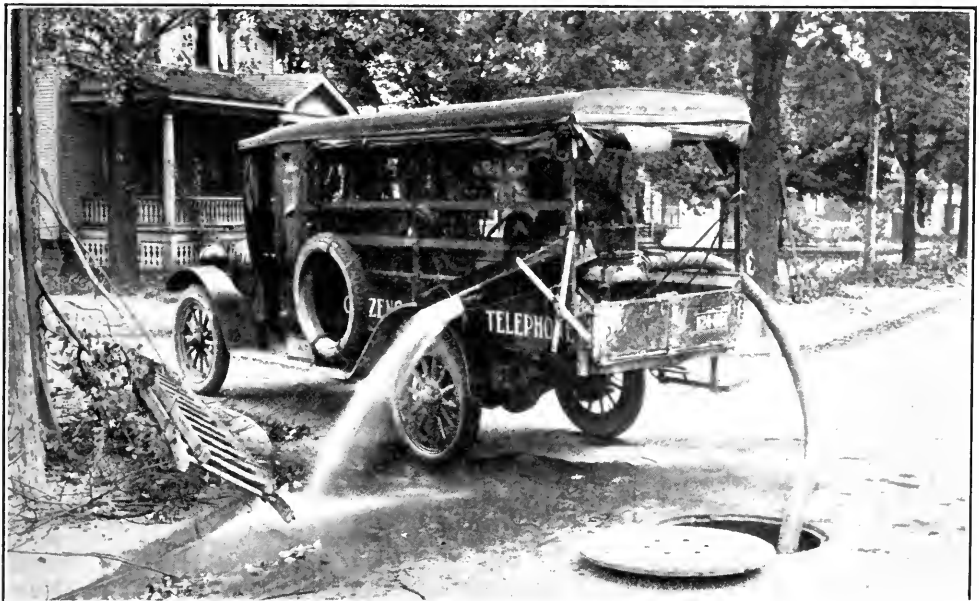
sides of the box are also good places for such slogans as "If you don't like to see rubbish on the streets, be careful where you throw yours."

This refuse box is well made to withstand the buffeting which its location will necessarily bring to it, and with small attention it proves an efficient means of helping to keep any city's streets and sidewalks comparatively free from such cluttering material as old newspapers, wrappings, paper bags, fruit skins and other unsightly refuse.

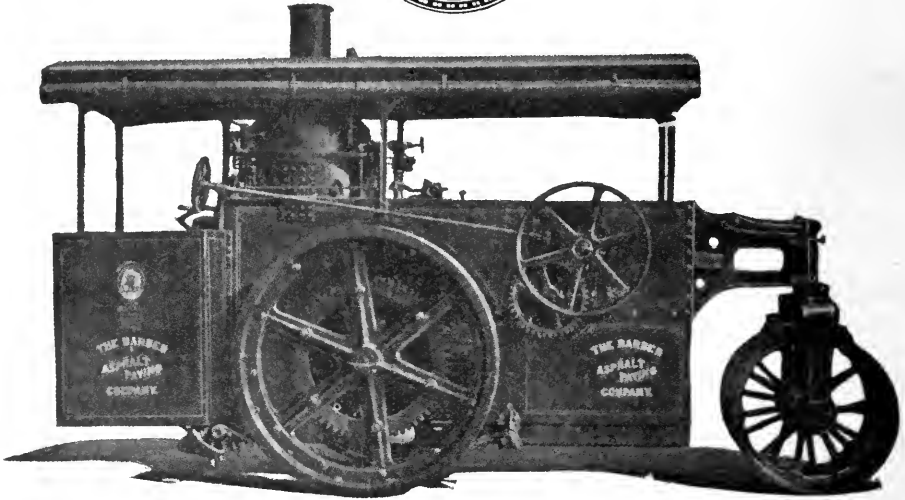
A Portable Gasoline Pumping Outfit

The Citizens Telephone Company, Lansing, Mich., has mounted a Novo Type N pumping outfit on one of its trucks for unwatering its conduit manholes. R. I. Briggs, District Manager of the company, states that on one job alone the company saved many times the cost of the pump.

In that particular instance they were putting in service a 200-pair cable designed to take care of the growth in the business district. Before the work of splicing these cables was completed, an unusually heavy rainstorm came up and the manholes started to fill with water, interfering with the men working on the cables. A hurry-up call was sent for the Novo dia-



PUMPING A MANHOLE WITH PORTABLE OUTFIT



New Iroquois Macadam Roller

Not just a "new" roller—a vastly different *type* of roller

The New Iroquois Macadam Roller was built from the practical road-builder's angle. That's why it represents a revolutionary change in design.

Every working part of the New Iroquois is a separate unit resting on a steel frame and supporting no weight but its own. Rack and strain on the boiler—so fruitful of leaks on the old type rollers—are, thus eliminated.

The New Iroquois Macadam Roller is compact, easy to operate, easy to repair and chock full of power. It is so sturdily built that it will stand the hardest kind of service with minimum adjustments and repairs.

Why worry along with that old roller when a telegram will start a New Iroquois to you the same day?

The Iroquois Line includes a full assortment of asphalt paving equipment. Put your needs up to us. *Write for Bulletins No. 8, 6 and 5.*



New York
Chicago
Pittsburgh

IROQUOIS SALES DEPARTMENT
THE BARBER ASPHALT
COMPANY
PHILADELPHIA

St. Louis
Kansas City
Atlanta
San Francisco

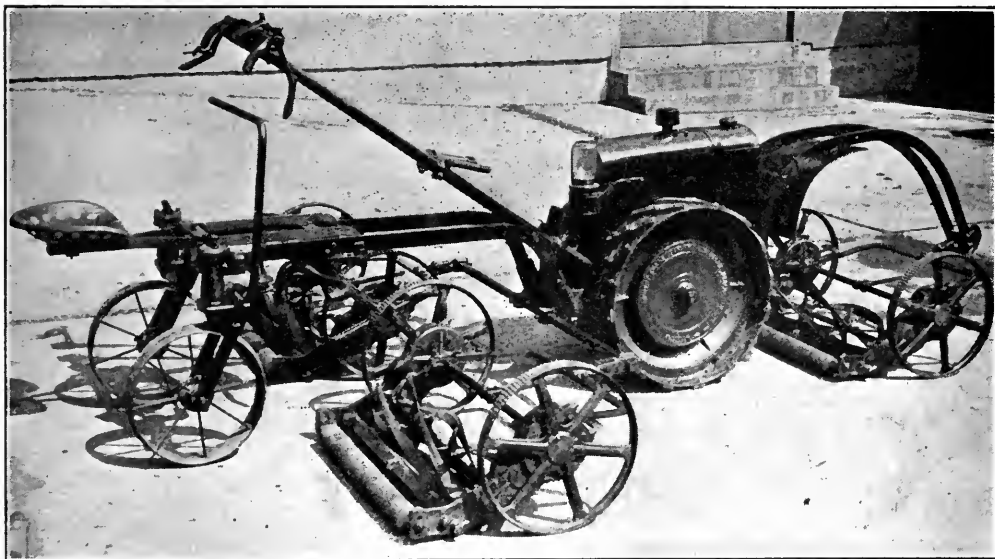
phragm pump, which is made by the Novo Engine Company, Lansing, Mich. It was loaded at once on a truck, as shown in the illustration, and was on the job in a few moments. It operated throughout the storm, draining the man-hole as fast as the water poured in, and keeping the water from reaching the unfinished work. Had the water reached the cables at that stage of the progress of the work, it would have meant pulling the cable for one section and replacing it with a new one, which would have delayed the work and involved a very heavy expense.

This diaphragm pump, operated by a gasoline engine, replaced a manually operated pump requiring three men. Until the company had the pump, water frequently rose above the conduit openings in the manhole, causing all sorts of trouble. Since the pump was purchased there has been no trouble in keeping manholes and conduits drained, regardless of weather conditions. The pump can be easily started and requires no attention until the manhole is pumped out.

The use of lawn mowers is confined to a small portion of the year—the hottest and most difficult time for the horse to work. After the mowing season is over, this Utilitor power mower is easily housed and needs no further attention until the next season. Its low first cost, large cutting capacity, economy of operation and up-keep, and low cost of maintenance when not in operation, are features of the machine. It is designed particularly with an idea of making the task of grass-cutting less burdensome. To this end everything needed to operate the machine is within easy reach of the operator's feet. The engine throttle and clutch control are directly in front of the driver; steering is accomplished by both hand tiller and foot control.

Nolen to Make City Plan for Spartanburg

The Park Commission of the city of Spartanburg, S. C., has entered into an agreement with John Nolen, Town and City Planner, Cam-



A POWER-OPERATED TRIPLE MOWER FOR PARKS OR GOLF COURSES

Power versus Horse for Mowing Lawns

The gasoline motor is fast supplanting the less efficient horse in practically every field. Motor power is cheaper in almost every instance and is also faster, thereby allowing greater output per man-power. Power-driven lawn-mowing apparatus is particularly superior to horse-drawn apparatus because of the steady progress of the unit over the ground, which makes for a smoother, more uniformly cut lawn. The Midwest Engine Company, Indianapolis, Ind., has placed on the market its Utilitor power mower, which has been found particularly useful in many large estates, parks and golf courses.

bridge, Mass., for the preparation of a comprehensive city plan and survey.

Sale of Mutual Plant

The Mutual Truck Company's plant and equipment at Sullivan, Ind., will be offered at public sale by the Receiver, December 22. The sale will include 12 acres of land with siding to the C. & E. I. and Illinois Central Railroads, a large modern brick building, steel truss roof, heating plant, machine tools, drawings, blueprints, and a miscellaneous stock of materials and parts for building a 2½-ton motor truck. The First National Bank, Sullivan, Ind., is the Receiver and E. D. Maple, the Trust Officer in charge.



THE WORTHINGTON TRACTOR AND SHAWNEE MOWER

The Shawnee Triple Mower has become the main dependence for parks, golf fairways and lawns of large estates throughout the country.

It is drawn easily by one horse.

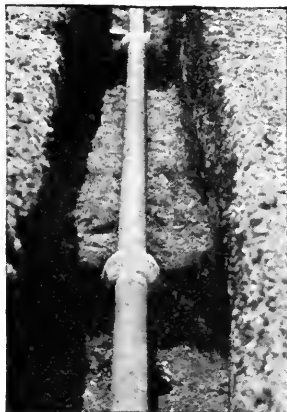
In combination with the Worthington Tractor it will mow four times as much lawn area as any other mowing apparatus in the world.

The Tractor is especially designed for lawn service. It improves the turf and does not mar or injure the surface. It has patented features which have given it immediate preeminence.

It displaces the horse and reduces the cost of the mowing operation one-half.

The gang mower alone and in combination with a tractor is broadly covered by patents owned by this company.

WORTHINGTON MOWER COMPANY
Shawnee-on-Delaware, Pa.



A SATISFACTORY SERVICE LINE OF
CAST IRON

Cast Iron Service Pipe

Some years ago the "Report of the Committee on Service Pipe" of the New England Water Works Association listed six important requirements for service pipe: (1) that it should not affect the water passing through it in such a manner as to make it injurious to the health of those using the water; (2) that it should not have a deleterious effect on the appearance, taste or odor of the water even though not injurious to the health; (3) that it should have a sufficient capacity to give adequate service at all times; (4) that it should be strong and durable; (5) that it should be easily laid; (6) that it should be inexpensive.

The United States Cast Iron Pipe and Foundry Company, Burlington, N. J., believes that cast iron answers these requirements admirably. Although service pipe of this material has been on the market for some time, many water-works officials are unaware of its existence. About 10 per cent of the larger cities of this country are listed as using cast iron for at least part of their services, and these cities find it very satisfactory. One engineer has stated that nothing will ever reduce the loss of water through leakage so much as the general adoption for service of cast iron pipe with joints that will stay permanently tight.

There need be no fear of metal poisoning from service pipes where cast iron is used, as it produces no compounds that will affect the health of those using the water. The U. S. Cast Iron Pipe and Foundry Company coat all service pipe with a standard water-pipe coating accepted by the American Water Works Association. If this coating becomes injured, exposing the metal, it will not disintegrate, but merely form its own protective coating of rust, which actually forms a part of the pipe and will not come away with the water.

The minimum diameter recommended for cast iron pipe is 2 inches. This size offers ample opportunity for ordinary needs, particularly as cast iron pipe does not fill up nearly as readily as other metals. Where a slightly larger

water-supply is required, a special 2½-inch service pipe may be used.

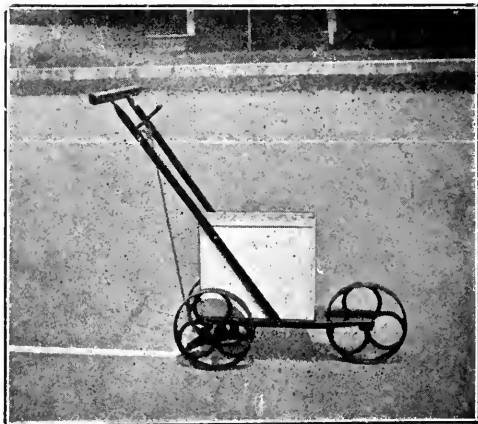
In most cities service pipe is laid by the regular water-works employees, who are perfectly familiar with lead-poured bell-and-spigot joints. This results in a very tight line, which at the same time has all of the flexibility of a regular bell-and-spigot main. The first cost of services is the last point which should be considered, for it is a very small item as compared to the cost of maintenance and renewals. However, cast iron pipe is not by any means the most expensive service pipe, and when durability and life are considered it is often the cheapest.

Marking Traffic Zones

In order to protect pedestrians as well as motor traffic in safety zones along street car tracks and at street crossings, many cities are adopting the use of painted lines on the pavement. This form has proved most successful and does away in most instances with the need of upright traffic posts, which are frequently knocked over and destroyed by truck traffic. Hand painting of traffic lines is difficult and frequently does not produce a good-looking or lasting job.

W. A. Johnson, 612 North Broadway, Yonkers, N. Y., is the inventor and sole manufacturer of the Line-O-Graph, a machine for painting white lines on pavements. It is made in several models. The "Junior A" model is specially adapted for marking streets, as it saves fully 75 per cent in labor, time and material and is particularly economical and durable. It makes lines 3 inches wide uniformly and spreads the paint evenly. With this machine is supplied one quart of Hoosier Street Marking White, which has been found particularly durable for this type of work. The tank capacity of the Junior Line-O-Graph is three gallons, sufficient to mark a large number of crossings or safety zones.

Most cities are now using the 3-inch-wide



A MACHINE TO MARK TRAFFIC LINES
ON STREETS



SPECIAL GARBAGE DUMP TRUCK

WOOD

(DETROIT)

Hydraulic Hoists

AND

Steel Dump Bodies

CITY DUMPING PROBLEMS

GARBAGE, RUBBISH, CINDERS, ETC.

PRINCIPAL CITIES USE WOOD-DETROIT EQUIPMENT.

Write for Literature and Information on Special Municipal Equipment.

WOOD HYDRAULIC HOIST AND BODY CO.

4196 BELLEVUE AVE.

DETROIT, MICH.



"PIONEER"



We are Asphalt Specialists. There is a "PIONEER" product complying with practically every asphalt or bituminous specification. Let us quote you on your requirements.

"PIONEER"

"PIONEER" Asphalts have had an enviable twenty-five year record. They are made to meet special conditions. They have stood up under most severe tests and have been recommended and used by most exacting engineers and contractors everywhere.

THE PIONEER ASPHALT CO.,

Lawrenceville, Ill.

line. Both the Line-O-Graph Junior A Model and the Aviation Model, which holds 20 gallons, are in use extensively throughout the United States. The Aviation Model may be used both for streets and for playgrounds by simply substituting whitewash for the paint used in marking streets, when it is to be used on the playgrounds.

Cleaning Mud and Filth from Sewers

One of the problems which confront a city engineer or superintendent of sewers in a city where the sewer grades are flat is the removal of accumulations of mud, silt and filth. The Self-Propelling Nozzle Company, 99 Water Street, New York City, has placed on the market a sewer-cleaning nozzle which propels itself through a sewer carrying with it a heavy fabric hose, which by means of the rotating streams caused by the pressure of the water on the inside of the nozzle loosens the mud and other material caked on the bottom. This nozzle has proved successful in many places, notably Berwick, Pa., Danbury, Conn., Concord, N. C., and Cincinnati, Ohio.

In Berwick, Pa., the self-propelling nozzle was attached to a heavy fabric hose and in less than half an hour opened up 300 feet of sewer on which three men had been at work for two days without success. When the nozzle was started down the sewer from an overflowing manhole, the speed with which the sewer was opened was limited only by the ability of the men to get the hose to the manhole. The sewer was 10 feet deep and under a brick pavement. On another occasion over 600 feet of storm sewer, 12 and 24 inches in diameter, which was completely filled with sand, silt and stone up to 2 inches, was cleaned thoroughly. The grade was very flat, but a hole was soon bored through and the water started. It was then necessary to pass a rope down the sewer and attach a heavy chain to drag out the stones. The materials caught at the lower manhole amounted to 16 yards, besides all the light material which went over the dam and passed down the sewer.

The Department of Street, Sewer and Catch-Basin Cleaning, Cincinnati, Ohio, reports that these nozzles have saved them much digging under the streets.

Another use for the nozzle was shown in Danbury, where a fire in a soft coal bin had been burning for over a month. The fire was underneath about 10,-

000 tons of coal and about 15 feet from the top. Every possible means was tried to get at the fire, until finally it was decided to attempt to attack the problem with the self-propelling nozzle. The nozzle was attached to a 20-foot length of 1½-inch iron pipe, which in turn was coupled to a 2½-inch fire hose and then attached to a near-by hydrant. After a small hole had been dug in the coal pile, the nozzle was placed in it and the water turned on. The nozzle worked its way into the center of the pile from different angles far below the surface, and within two hours after placing the nozzle in the pile the fire was drowned out. It has also been found that with a 10-foot 1½-inch iron pipe with the nozzle at one end and the pipe coupled to a fire hose, it has been possible to fight fires under brick walls, tin roofs and in cellars where dense smoke, chemicals and explosives prevent entry.

Clark Increases Stock

The H. W. Clark Company, Mattoon, Ill., has announced that it has increased its capital stock, consisting of \$60,000 common and \$15,000 preferred cumulative stock, to a total of \$200,000, consisting of \$150,000 common and \$50,000 7 per cent cumulative preferred stock.

New Work at Martins Ferry, Ohio

Martins Ferry, Ohio, has commissioned the J. N. Chester Engineers, Union Bank Building, Pittsburgh, Pa., to make an investigation and report for a prospective improvement in the municipal electric light and water-supply system.



THE MUD REMOVED FROM A CLOGGED SEWER IN LONG ISLAND CITY, N. Y.



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Concrete lighting standards are used in Civic improvements where substantial service is combined with artistic harmony.

Massey Concrete Products Corp.
 Chicago Pittsburgh New York
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What's the Cost?

of Protecting City Parks—Shade Trees and Foliage

Many cities have considered this carefully, investigating each point fully and their decision is—

IT COSTS MORE NOT TO SPRAY

A real efficient sprayer is the first step. A machine that has capacity and pressure for a thorough and quick job. No men waiting around the machine. No slowing down to finish a tree. On the move every minute. That cuts costs.



Shade Tree Spraying in Dayton, O.

The number of cities that have specified **BEAN PARK SPRAYERS** after a careful test of the machine is the most convincing evidence we can offer.

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Standardization of Water-Works Brass Goods

The committees on the standardization of brass goods for water-works, representing respectively the New England Water Works Association, the American Water Works Association, and the National Association of Brass Manufacturers, met at Bridgeport, Conn., on September 14, and after a detailed discussion unanimously adopted a report to be presented to their respective organizations.

On all brass goods intended for underground service, the metal mixture is to be standardized, specifying definite limits of tolerance for each ingredient, and all essential dimensions are to be standardized and minimum weights specified. The American Association of Brass Manufacturers was requested to submit suitable specifications covering these items, for the approval of the two water-works associations.

The committee voted to eliminate from the specifications for corporation cocks the $\frac{3}{8}$ -inch size, all-round bodies, the female-threaded outlet, the hex plug recess, the Mueller coupling thread, the quarter-bend coupling, increasing-size lead flange cocks, lead flange cocks for 1-A lead, and on the sizes smaller than $1\frac{1}{4}$ -inch to eliminate squares and hexes. In addition, it was decided to discourage the use of the $\frac{1}{2}$ -inch and the $\frac{5}{8}$ -inch size cocks.

The specifications call for lead flange cocks for 3-A lead to be the same as those for 2-A lead, the 3-A lead pipe to be made with an outside diameter the same as the standard outside diameter of 2-A lead, the difference in the thickness of the wall to be secured by reducing the inside diameter of the 3-A lead. This thickness should be such as to give the same resistance to rupture by internal pressure to each size in the series from nominal $\frac{1}{2}$ -inch to nominal 2-inch inclusive. All lead flange cocks are to be designed to stand the same pressure as 3-A lead pipe.

All corporation cocks are to have two flat sides for wrench hold, and sizes $1\frac{1}{4}$ -inch, $1\frac{1}{2}$ -inch and 2-inch are to have a hex on the inlet side; all lead flange corporation cocks are to have lead flange coupling thread such as is used by the H. Mueller Manufacturing Company for 2-A lead pipe; the thread on the inlet side of corporation cocks is to be the Mueller thread, or the coarse thread for wood mains, or the standard iron pipe thread.

Corporation cocks with Mueller inlet threads are to have full bore, and on the outlet end a Mueller screw plug thread, and either a lead flange coupling thread or a standard iron pipe coupling thread one size larger than the nominal size of the cock. On the $\frac{5}{8}$ -inch size this is to be a 1-inch thread. The length, taper and number of threads of this iron pipe coupling thread are to be governed by the Briggs system of I. P. fittings. Corporation cocks with coarse thread for wood mains are to have a full plain bore and coupling threads, as described immediately above. Corporation cocks with iron pipe inlet threads are to be discouraged, and not to be made in a $\frac{5}{8}$ -inch size. The bore of the $\frac{1}{2}$ -inch cock is to be $15/32$ -inch, and of the

$\frac{3}{4}$ -inch cock $11/16$ -inch, of the 1-inch cock $7/8$ -inch, and of the 2-inch cock $1\ 29/32$ -inch. The outlet end is to be provided with a Mueller screw plug thread and coupling threads.

The remaining four items state that couplings with a male iron pipe thread at the outlet end are to have this thread one size smaller than the thread on the coupling nut. All couplings, including meter couplings and all solder nipples, are to have full bore. It is recommended in curb cocks that the lead flange couplings correspond to those recommended for corporation cocks, and that all male threads, fine threads and all other special threads, including the Salt Lake City and the Fitchburg patterns, be eliminated and that curb cocks with check are to close clockwise. The Minneapolis threads on curb cocks are to be standardized as follows: $\frac{1}{2}$ -inch, $\frac{5}{8}$ -inch and $\frac{3}{4}$ -inch cocks, $1\frac{1}{2}$ -inch I. P.; 1-inch cocks, 2-inch I. P.; $1\frac{1}{4}$ -inch cocks, $2\frac{1}{2}$ -inch I. P.; $1\frac{1}{2}$ -inch cocks, 3-inch I. P.; and 2-inch cocks, $3\frac{1}{2}$ -inch I. P.

The report of the joint committee was signed by David A. Heffernan, Milton, Mass., representing the New England Water Works Association, W. R. Edwards, Paterson, N. J., and J. Walter Ackerman, Watertown, N. Y., representing the American Water Works Association, Fred Mueller of H. Mueller Manufacturing Company, and Fred Schuldner of the United Brass Manufacturing Company, representing the National Association of Brass Manufacturers.

New Pittsburgh and Chicago Offices for Payne Dean

Payne Dean, Ltd., 103 Park Avenue, New York City, manufacturer of the Dean Control for electrical operation of water, gas and high-pressure steam valves, has established offices in Pittsburgh and Chicago. C. J. Burrage, formerly of the Engineering Department of the Cutler Hammer Mfg. Company, is in charge of the Pittsburgh office in the Bessemer Building, and A. H. Kohlbusch, formerly superintendent of construction for the Public Service Electric Company, is in charge of the Chicago office in the Lumber Exchange Building, 11 South La Salle Street.

Fire-Fighting at Reading, Pa.

The interesting illustration of an exhibition of the work of modern fire apparatus in action, which appears on the front cover of this issue of THE AMERICAN CITY, is published through the courtesy of the American-LaFrance Fire Engine Company, Inc., Elmira, N. Y., manufacturers of all types of fire apparatus and supplies.

Wood in Charge of Philadelphia District

Alan A. Wood, formerly connected with the Providence plant of the Builders Iron Foundry and the Diamond Machine Company, associated companies, as engineer and in a sales capacity, is now located in Philadelphia as Sales Manager of that district.

General Electric Company Lights Schenectady with Union Metal Lamp Standards

Additional Lighting for The Electrical City

The General Electric Company, in selecting the proper type of lighting standard to be placed on the streets of the city where their executive offices and largest plant are located, awarded the contract for a large installation of Union Metal Lamp Standards, Design No. 807, carrying General Electric Ornamental Luminous Arc Lamps.

This selection is in line with the action of hundreds of progressive cities and towns throughout the United States and foreign countries who are availing themselves of Union Metal-General Electric lighting service.

The engineering experience of these two companies dates back to the very beginning of ornamental street lighting and out of this experience they are qualified and ready to point out "The Right Way for Your White Way."

Write for complete catalog of designs.

The Union Metal Manufacturing Co.
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Design No. 807
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standard for
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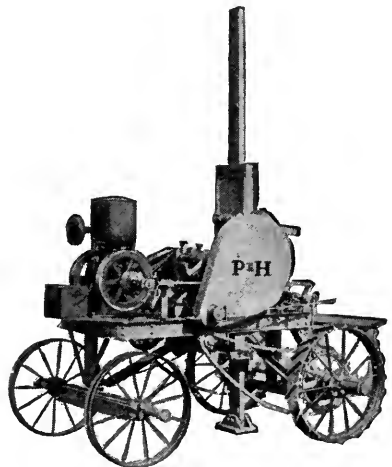
A UNIQUE TEST OF TWELVE PORTABLE FIRE ENGINES FOR TOKIO, JAPAN

A Large Group of Hand-drawn Motor Fire Pumps

The units shown in the photograph above are part of the 12 portable pumping engines recently shipped by the Northern Fire Apparatus Company, 2422 University Avenue, S. E., Minneapolis, Minn., to Tokio, Japan. These units consist of Northern Type "C" pumps with G. B. & S. standard automobile 4-cylinder, 22½-horse-power motors designed to be drawn by hand through the narrow streets in the smaller cities and villages of Japan. The capacities of the pumps meet the standard Underwriters' requirements of 225 gallons.

A year ago the Northern Fire Apparatus Company received an order for one of this type of machine direct from a Japanese firm which had been appointed as Northern agents. The machine reached Tokio about March, 1921. It was put under competitive tests with foreign makes of machines. The result was an order for 12 of this type, all of which had been sold previous to their shipment from the factory. The machines are entirely practical for portable service, there being about a half-dozen of this make in service at the present time in the United States. They can be used as auxiliary water-works units or can be held solely for fire-fighting purposes. They are mounted on wooden wheels and are readily transported.

and gears are supplied with enclosing guards, and the tamper and steering cables used are ⅜-inch diameter, instead of ¼-inch. New type traction wheels are furnished with extension axles to allow for changing the tread from 58 inches to 76 inches. The standard tamping head is 150 pounds in weight, as before. Other refinements are embodied in the design, which enables the machine to speed up all kinds of tamping in ditches and trenches. Only one man is required to operate it, control of the power ram and the forward or backward movement of the tamper being readily accomplished from the operator's seat.



A HANDY TAMPING MACHINE

A New Power Tamper

The accompanying illustration shows the latest model power traction tamper, made by the Pawling and Harnischfeger Company, Milwaukee, Wis. This new type has a number of improvements over previous models. All chains



Monax Installation, Fourteenth Street, Denver, Colo.

GOOD STREET LIGHTING

makes seeing easy and comfortable, prevents crime, and attracts homeseekers. It rouses civic pride, makes property more valuable and advertises a street or city. Well-lighted business streets are busy streets, and stores located on well-lighted streets do more and better business.

MACBETH-MONAX GLOBES

get more and better light from the same current, or the same light from less current and make seeing easy and comfortable for passersby. They are handsome by day and by night, are easily cleaned, require less handling and are not fragile.

STREET LIGHTING SUGGESTIONS

City officials, civic organizations and any one else who is interested in Good Street Lighting can secure information and literature upon request to our Street Lighting Department.

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A Statement of the Present Status of Imhoff Sewage Treatment Tank Patents

The Imhoff sewage tank patents formerly owned by Dr. Karl Imhoff, Essen, Germany, were introduced into the United States in 1910, the earliest installation in this country being three municipal sewage disposal plants at Atlanta, Ga., from the designs of Hering and Fuller, of New York City. No charge was made to Atlanta by Dr. Imhoff for royalties. In May, 1911, Dr. Imhoff arranged for United States and Canadian representation, with the Pacific Flush Tank Company, 4241-3 East Ravenswood Avenue, Chicago, Ill., through its president, S. Fisher Miller, Singer Building, 149 Broadway, New York City, as commercial representatives.

When the United States entered the war, Dr. Imhoff became an alien enemy, and the Pacific Flush Tank Company, under the provisions of the "Trading with the Enemy Act," immediately reported to the United States Government the existence of the patents and full information regarding them, reported moneys on deposit in this country to the credit of Dr. Imhoff in their possession, and gave a full list of towns that had constructed the Imhoff tanks and that had not paid the royalty fees. The Federal Trade Commission for the United States Government, after careful investigation into the patents, desiring to serve the American public in the same manner as before, gave an exclusive license, No. 7, dated December 17, 1917, to the Pacific Flush Tank Company, to continue licensing towns for Imhoff sewage tanks in behalf of the United States Government, on payment of the same royalty fees. Bi-yearly, moneys collected were reported and sent to the Alien Enemy Custodian, less collection expenses.

On March 1, 1919, the Alien Property Custodian, acting under the provisions of the "Trading with the Enemy Act" and the amendments thereto, and executive orders and proclamations issued in pursuance thereof, seized these German patents, and on March 21, 1919, they were sold, together with all claims and damages, for profits and damages recoverable at law or in equity for the past infringement of said patents, to The Chemical Foundation, Inc. This company was organized to foster the development and advancement of chemistry and allied sciences and industries in useful arts and manufactures in the United States, and in furtherance of such objects and purposes, to acquire by purchase from the Alien Property Custodian and others, patents and other property, and to hold such property so acquired in a fiduciary capacity for the Americanization of such industries as may be affected thereby, and for the exclusion or elimination of alien interests hostile or detrimental to the said industries in the United States.

The Chemical Foundation, Inc., purchased these Imhoff patents, together with a large number of other patents, trade marks, copyrights, etc., and will continue for the life of the Imhoff sewage tank patents to issue licenses for the use of Imhoff sewage tanks, through the Pacific

Flush Tank Company (with which it has made a contract, to act as exclusive agent or representative), on payment of the same royalty fees as heretofore charged. The title of these patents having now permanently passed from a foreign interest to an all-American interest, it is assumed that there will be less hesitancy on the part of municipalities in paying the moderate royalty fees charged for the use of these patents.

Bickel Becomes District Manager for Holt

W. A. Bickel has been appointed District Manager, in charge of the consolidated territory of Iowa and Nebraska, for the Holt Manufacturing Company, Peoria, Ill. Mr. Bickel has for the past year been District Manager in charge of the Des Moines branch, but will now make his headquarters at the Omaha branch, and the consolidated districts will include the states of Iowa, Nebraska and the southern part of South Dakota. The consolidation of the two territories under Mr. Bickel's management is a recognition of his success in the Iowa territory. His new location will be 2429 Farnam Street, Omaha, Nebr.

An Advertising Novelty for Cities and Civic Organizations

A rather interesting device for advertising the name of your home city, which has met with considerable favor, has been placed on the market by the Niagara Metal Stamping Corp., Niagara Falls, N. Y., manufacturers of embossed metal house numbers, license plates and street signs. This novelty is known as the Premax Metal Auto Pennant, and consists of a neat embossed metal plate bearing the town name. The pennant is designed for attachment to the automobile license plate by special clips furnished with it. It is heavily enameled in two colors to match the state license plate, or it may be had in any other color combination desired.

The metal pennant is proving quite popular with civic organizations, which are adopting it in different parts of the country as a means for stimulating local pride and sentiment.



A METAL NAME PLATE ATTACHED TO THE LICENSE NUMBER ADVERTISES THE CITY

TRADE **TIREX** MARK
Heavy Duty Portable Cable



"Tirex" wears like a tire tread. The outer protective covering is 60% tough, live rubber compound, inseparably bound by a double hard-twisted reinforcement to the inner jacket and filling of 40% rubber compound. The flexible conductors are insulated with 30% rubber compound.

Municipalities should use "Tirex" cable on portable electric tools and machines. It wears at least four times as long as fibrous covered cable, saving 75% of the loss due to idle men and machines during repairs and replacements.

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The quality of rubber insulated wire depends on more than any standard specifications. The ability and skill of the manufacturer determine quality and life.

Code Wire "Spiralweave" Cable
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